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HEARING

ON

NATIONAL DEFENSE AUTHORIZATION ACT  
FOR FISCAL YEAR 2004—H.R. 1588

AND

OVERSIGHT OF PREVIOUSLY AUTHORIZED  
PROGRAMS

BEFORE THE

COMMITTEE ON ARMED SERVICES  
HOUSE OF REPRESENTATIVES  
ONE HUNDRED EIGHTH CONGRESS

FIRST SESSION

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TACTICAL AIR AND LAND FORCES SUBCOMMITTEE  
HEARING

ON

**TITLE I—PROCUREMENT**  
**TITLE II—RESEARCH, DEVELOPMENT,**  
**TEST, AND EVALUATION**

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HEARINGS HELD  
MARCH 12, 20, 26, AND APRIL 2, 2003



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## TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

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**H. R. 1588**

To authorize appropriations for fiscal year 2004 for military activities of the Department of Defense, to prescribe military personnel strengths for fiscal year 2004, and for other purposes.

**IN THE HOUSE OF REPRESENTATIVES**

APRIL 3, 2003

MR. HUNTER (for himself and Mr. SKELTON) (both by request) introduced the following bill; which was referred to the Committee on Armed Services

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**A BILL**

To authorize appropriations for fiscal year 2004 for military activities of the Department of Defense, to prescribe military personnel strengths for fiscal year 2004, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

**SECTION 1. SHORT TITLE.**

This Act may be cited as the "National Defense Authorization Act for Fiscal Year 2004".

\* \* \* \* \*

**DIVISION A—DEPARTMENT OF DEFENSE  
AUTHORIZATIONS**

**TITLE I—PROCUREMENT**

**Subtitle A—Authorization of Appropriations**

**SEC. 101. ARMY.**

Funds are hereby authorized to be appropriated for fiscal year 2004 for procurement for the Army as follows:

- (1) For aircraft, \$2,128,485,000.
- (2) For missiles, \$1,459,462,000.
- (3) For weapons and tracked combat vehicles, \$1,640,704,000.
- (4) For ammunition, \$1,309,966,000.
- (5) For other procurement, \$4,216,854,000.

**SEC. 102. NAVY AND MARINE CORPS.**

(a) NAVY.—Funds are hereby authorized to be appropriated for fiscal year 2004 for procurement for the Navy as follows:

- (1) For aircraft, \$8,788,148,000.
- (2) For weapons, including missiles and torpedoes, \$1,991,821,000.
- (3) For shipbuilding and conversion, \$11,438,984,000.
- (4) For other procurement, \$4,679,443,000.



## VIII

(b) MARINE CORPS.—Funds are hereby authorized to be appropriated for fiscal year 2004 for procurement for the Marine Corps in the amount of \$1,070,999,000.

(c) NAVY AND MARINE CORPS AMMUNITION.—Funds are hereby authorized to be appropriated for fiscal year 2004 for procurement of ammunition for the Navy and Marine Corps in the amount of \$922,355,000.

### SEC. 103. AIR FORCE.

Funds are hereby authorized to be appropriated for fiscal year 2004 for procurement for the Air Force as follows:

- (1) For aircraft, \$12,079,360,000.
- (2) For missiles, \$4,393,039,000.
- (3) For procurement of ammunition, \$1,284,725,000.
- (4) For other procurement, \$11,583,659,000.

### SEC. 104. DEFENSE-WIDE ACTIVITIES.

Funds are hereby authorized to be appropriated for fiscal year 2004 for defense-wide procurement in the amount of \$3,691,006,000.

### SEC. 105. DEFENSE INSPECTOR GENERAL.

Funds are hereby authorized to be appropriated for fiscal year 2004 for procurement for the Defense Inspector General in the amount of \$2,100,000.

### SEC. 106. DEFENSE HEALTH PROGRAM.

Funds are hereby authorized to be appropriated for fiscal year 2004 for the Department of Defense for procurement for carrying out health care programs, projects, and activities of the Department of Defense in the total amount of \$327,826,000.

### SEC. 107. CHEMICAL AGENTS AND MUNITIONS DESTRUCTION.

Funds are hereby authorized to be appropriated for fiscal year 2004 for chemical agents and munitions destruction in the amount of \$1,650,076,000 for—

- (1) the destruction of lethal chemical weapons in accordance with section 1412 of the Department of Defense Authorization Act, 1986 (50 U.S.C. 1521); and
- (2) the destruction of chemical warfare material of the United States that is not covered by section 1412 of such Act.

## Subtitle B—Multi-Year Contract Authorizations

### SEC. 111. MULTIYEAR PROCUREMENT AUTHORITY FOR NAVY PROGRAMS.

(a) MULTI-YEAR CONTRACT AUTHORITY.—Beginning with the fiscal year 2004 program year, the Secretary of the Navy may, in accordance with section 2306b of title 10, United States Code, enter into multiyear contracts for procurement of the following:

- (1) F/A-18 aircraft.
- (2) E-2C aircraft.
- (3) the Tactical Tomahawk missile.
- (4) the Virginia class submarine.

(b) SHIPBUILDER TEAMING.—Paragraphs (2)(A), (3), and (4) of section 121(b) of the National Defense Authorization Act for Fiscal Year 1998 (Public Law 105-85; 111 Stat. 1648) apply to the procurement of Virginia class submarines under this section.

### SEC. 112. AMENDMENT TO MULTIYEAR PROCUREMENT AUTHORITY FOR C-130J AIRCRAFT FOR THE AIR FORCE.

Section 131(a) of the Bob Stump National Defense Authorization Act for Fiscal Year 2003 (Public Law 107-314; 116 Stat. 2475) is amended by striking “40 C-130J aircraft” and inserting “42 C-130J aircraft”.

## TITLE II—RESEARCH, DEVELOPMENT, TEST, AND EVALUATION

### Subtitle A—Authorization of Appropriations

#### SEC. 201. AUTHORIZATION OF APPROPRIATIONS.

Funds are hereby authorized to be appropriated for fiscal year 2004 for the use of the Armed Forces for research, development, test, and evaluation, as follows:

- (1) For the Army, \$9,122,825,000.
- (2) For the Navy, \$14,106,653,000.
- (3) For the Air Force, \$20,336,258,000.
- (4) For Defense-wide research, development, test, and evaluation, \$18,260,918,000, of which \$286,661,000 is authorized for the Director of Operational Test and Evaluation.
- (5) For the Defense Health Program, \$65,796,000.
- (6) For the Defense Inspector General, \$300,000.

## **Subtitle B—Ballistic Missile Defense**

### **SEC. 211. RENEWAL OF AUTHORITY TO ASSIST LOCAL COMMUNITIES IMPACTED BY BALLISTIC MISSILE DEFENSE SYSTEM TEST BED.**

Section 235(b)(1) of the National Defense Authorization Act for Fiscal Year 2002 (Public Law 107-107; 115 Stat. 1041) is amended by striking “for fiscal year 2002” and inserting “for fiscal years after fiscal year 2001”.

## **Subtitle C—Other Matters**

### **SEC. 221. RESCIND THE PROHIBITION ON RESEARCH AND DEVELOPMENT OF LOW-YIELD NUCLEAR WEAPONS.**

Section 3136 of the National Defense Authorization Act for Fiscal Year 1994 (Public Law 103-160; 107 Stat. 1946) is repealed.

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**FISCAL YEAR 2004 NATIONAL DEFENSE AUTHORIZATION ACT—ARMY AND NAVY ROTORCRAFT PROGRAMS AND TECHNOLOGY BASE**

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HOUSE OF REPRESENTATIVES,  
COMMITTEE ON ARMED SERVICES,  
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE,  
*Washington, DC, Wednesday, March 12, 2003.*

The subcommittee met, pursuant to call, at 5:43 p.m., in room 2118, Rayburn House Office Building, Hon. Curt Weldon (chairman of the subcommittee) presiding.

**OPENING STATEMENT OF HON. CURT WELDON, A REPRESENTATIVE FROM PENNSYLVANIA, CHAIRMAN, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE**

Mr. WELDON. This afternoon, the Tactical Air and Land Forces Subcommittee meets to receive testimony from both government and industry witnesses on the breadth of the Department of Defense's current rotorcraft programs and the industrial base to support those platforms, as well as the technologies for future rotorcraft requirements.

I have been told this is the first such hearing ever by this committee on the rotorcraft industrial base. And I say it is about time.

Currently, there are 11 different major rotorcraft programs within the Department of Defense (DOD). All are manufactured by one of the three major helicopter manufacturers represented here today—Bell Textron, Boeing, and Sikorsky. I might add there used to be four, and now we have three major manufacturers. We want to make sure we do not end up with two.

While there are 11 different types of rotorcraft programs, most of these aircraft were fielded beginning in the early 1970s and continuing through the 1990s. In the fiscal year (FY) 2004 budget request, funds are requested for only two major platforms: two variants of the Sikorsky 860, for both the Army and the Navy, and two variants of the Bell Boeing V-22 tilt-rotor aircraft for the Marine Corps and the Air Force.

The remainder of procurement funds requested are for six major upgrade programs to existing helicopters, which include the Apache Longbow heavy-attack helicopter, the Army and U.S. Special Operations Command Chinook heavy-lift helicopter, the Army Blackhawk utility helicopter, the Marine Corps Huey utility helicopter, and the Marine Corps Sea Cobra Attack helicopter.

I am concerned that most of these aircraft have already reached at least their first 20-year lifespan with the average age of Chinook variants to be upgraded to the more capable F models being over 12 years old.

What is deceiving about the age of the D variants is that they are already in their second remanufacture. Similarly, the average age of the Marine Corps Huey, which will be upgraded to the Yankee model, is already 28-plus years old.

I am somewhat less concerned about the average age of the current Marine Corps Sea Cobra fleet, which is over 13 years old.

Fortunately, it appears that we will begin this upgrade in fiscal year 2004 to achieve economies of scale while upgrading the UH-1N variant.

As far as future platforms, there are only two rotorcraft programs currently in development.

The Army has request \$1.1 billion in fiscal year 2001 for continued development of its Comanche reconnaissance attack helicopter. The Comanche is designed to replace the Kiowa Warrior, which is forecast to remain in the inventory for the next 20 years while the Comanche continues in development and is fielded. It appears the Comanche program is finally funded adequately in this request, and we will be watching this program's progress throughout the fiscal year, since this is such a pivotal year for the program.

The Department of the Navy has requested \$197.4 million in the fiscal year 2004 request for the replacement of the VH-3 Presidential Support helicopters, which are over 27 years old.

The point is the Department of Defense's rotorcraft fleet is getting pretty long in the tooth. And the lifespan of the current fleet will be used up much faster over the next several years, now that we are operating our forces at such a much higher tempo in the war on terrorism and especially if we go to war with Iraq.

I am concerned that the adequate amount of resources for rotorcraft are not being applied by DOD since most new aircraft are being produced at a minimum sustaining rate and the aircraft that are being upgraded could be modified and fielded at a much higher economic rate.

And I would add for my colleagues, as a senior member of the Science Committee, National Aeronautics and Space Administration (NASA) Ames has a responsibility for rotorcraft research. The budget for the next two years for NASA rotorcraft research is zero dollars each year—zero. Not a dime of money. As a secondary factor, they said they are going to put \$15 million in fiscal year 2005 to match \$15 million that the Army would put forward. That is a separate issue that we have to be cognizant of, that we are not getting the support for rotorcraft research from the non-defense agencies, as well as the concern that we have relative to DOD agencies.

I would hope that DOD would not allow the presidential replacement helicopter program to become a prolonged development initiative like the Comanche has been. This does not serve our forces well, who should have the best technology in the world, nor the U.S. companies that are struggling to maintain some production and research and development capability to continue to fulfill future defense requirements and try to remain competitive in international markets.

Also, before the subcommittee today are the future technology initiatives that are under way to produce advanced future rotorcraft for the military. From my experience as chairman of this committee's former Military Research and Development Subcommittee,

I believe that we need to spend more on rotorcraft technologies and related research and development efforts. This is the seed corn that will keep the U.S. rotorcraft industrial base viable to fulfill future defense requirements and remain internationally competitive, especially with such diverse needs as homeland security, drug interdiction, and other challenges where our rotorcraft, I think, offer an excellent opportunity for us to excel.

Today we have both the government panel of witnesses, representing the Department of the Army and the Department of the Navy, as well as an industry panel comprised of the Chief Executive Officers (CEOs) of the three major U.S. rotorcraft manufacturers.

Our DOD panel is comprised of Major General Joseph Bergantz, Program Executive Officer (PEO) for Army aviation. General, it is great to have you here.

Dr. Thomas Killion, Director for Technology under the Deputy Assistant Secretary of the Army for Research and Technology. Thank you.

Rear Admiral Tom Kilcline, Jr., head of Aviation Plans and Requirements branch for Navy Warfare Directorate. Thank you.

And Mr. Thomas Laux, acting Program Executive Officer, Air Assault and Special Missions programs. Thank you also.

Our industry panel will consist of Mr. Rhett Flater. Rhett is the Executive Director of the American Helicopter Society International. John Murphy, Chairman and CEO of Bell Helicopter Textron. Roger Krone, Senior Vice President of Army systems for The Boeing Company. Dean Borgman, President, Sikorsky Aircraft Corporation.

I would like to proceed today with the first panel's testimony and then go into questions for that panel, and then immediately take the second panel's testimony, which will then be followed by questions.

Before I turn it over to my good friend from Hawaii, I would like to extend the condolences of myself and this committee to the families of the soldiers that were lost in the Army Blackhawk that crashed yesterday at Fort Drum, New York, and our hopes for a full recovery to the two survivors of that crash. I would ask my colleagues to join in a moment of silence meditation in recognition and honor of these brave American patriots.

(MOMENT OF SILENCE)

I would now like to recognize the gentleman from Hawaii and my good friend, Neil Abercrombie, for any remarks he would like add.

And I would say the reason we are holding this hearing at this time is we have a very crammed schedule, and we are going to take advantage of as much of an opportunity for hearings. Neil is a very flexible leader, said, "Curt, I will come any time you are there." So we are here, 5:00 to 7:00, showing that we do care about these issues, and want to make sure that we have an opportunity to talk about some very vitally important programs for our nation.

My good friend, Neil.

[The prepared statement of Mr. Weldon can be found in the Appendix on page 57.]



**STATEMENT OF HON. NEIL ABERCROMBIE, A REPRESENTATIVE FROM HAWAII, RANKING MEMBER, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE**

Mr. ABERCROMBIE. Thank you very much, Mr. Chairman. As usual, your command of the subject matter is second to none. And with that, I would like to get to the panels as quickly as possible.

Mr. WELDON. I thank the gentleman.

I would also like to thank our vice chairman who has now been announced, Dr. Gingrey. Thank you for joining this panel, and thank you for the leadership role that I expect you to play this year.

Dr. GINGREY. Thank you, Mr. Chairman.

Mr. WELDON. With that, we will turn it over to General Bergantz.

It is all yours.

**STATEMENT OF MAJ. GEN. JOSEPH L. BERGANTZ, PROGRAM EXECUTIVE OFFICER FOR AVIATION, DEPARTMENT OF THE ARMY; DR. THOMAS H. KILLION, DIRECTOR FOR TECHNOLOGY UNDER THE DEPUTY ASSISTANT SECRETARY OF THE ARMY FOR RESEARCH AND TECHNOLOGY; REAR ADM. (RDML) TOM KILCLINE, HEAD, AVIATION PLANS AND REQUIREMENTS BRANCH (N780) DEPARTMENT OF THE NAVY; AND MR. TOM LAUX, ACTING PROGRAM EXECUTIVE OFFICER, (AIR ANTI-SUBMARINE WARFARE, ASSAULT AND SPECIAL MISSIONS) DEPARTMENT OF THE NAVY**

General BERGANTZ. Thank you, sir.

Chairman Weldon, Representative Abercrombie and distinguished members of this subcommittee, I want to thank you all for inviting us over to have this opportunity to brief you on Army aviation and to tell you about our rotorcraft programs.

As mentioned, I am Joe Bergantz, the PEO for Aviation. We have also got with us here Colonel John Bendyk; he is the division aviation chief for the deputy chief of staff for G-8.

Sir, I have a written statement that I submitted for the record, and I have about 10 minutes' worth of comments here to open up. And then we have provided each of you a packet that we will go through and you can follow as I go through my comments. And we are prepared then to get, in the question and answer portion.

Mr. WELDON. Thank you, General. And budget increases are directly in response to the length of your statement. So just keep that in mind. [Laughter.]

General BERGANTZ. Okay.

Army aviation is a key enabler to the ground force and an integral part of the legacy, interim, and objective force, as well as homeland security. Army aviation plays a major role in combat, combat support, and combat service support. And we see it as a provider in those areas using the Apache, the Blackhawk, the Chinook, the Kiowa Warrior, and in the future the Comanche and unmanned aerial vehicles (UAVs).

Underpinning this acquisition process and this modernization is a strong requirements base. Requirements typically bubble up either from the field or they come in through the training and doctrine command centers and schools. They are gathered together

and put into what is called an operational requirements document (ORD). This is then vetted at the Department of the Army level and in a process called the AROC, which is the Army Requirements Oversight Council. This council vets those requirements, and if it is a major decision acquisition program, those requirements are then taken to the joint staff level for the JROC, the Joint Requirements Oversight Council, to review.

The consistency of the JROC is basically a body that has the vice chiefs, the assistant commandant, and it also is chaired by the Vice Chairman of the Joint Chiefs. But the real business done up there is the JROC ensures that they determine and rationalize the requirements across the services. They ensure that all the non-material approaches have been looked at before we, you know, pursue a material approach. They prioritize the joint requirements, and they also evaluate alternatives based on cost schedule and technical performance. And then finally they assure that the key performance parameters are identified, that they are reasonable, and that reasonable thresholds and objectives have been set.

Recent JROC actions concerning Army programs include the approval of the ORDS for Comanche, Blackhawk and Chinook, and also the setting of key performance parameters for those programs.

Now that I have kind of outlined the requirements process, we will get into more of the procurement process, which is my lane in this.

A year ago, Comanche was struggling. And I can tell you now, though, it is in good shape, after a year of hard work. And it has the budget and the schedule to be successful.

Comanche, the first helicopter that we want to talk about today, is a multi-role, armed, reconnaissance and a light-attack aircraft. It provides close combat, vertical maneuver, and mobile strike capabilities, fully interoperable with the future combat systems that we are developing as well and with joint assets. It is built by Boeing and Sikorsky.

It was restructured, as I said, last year. On the 7th of October, we had a Defense Acquisition Board (DAB) with Mr. Aldridge, and it was approved to go forward.

The acquisition strategy is evolutionary in scope now. We are presently in the engineering and manufacturing development phase. We will go through a low-rate initial production phase, and then go into blocks. Presently approved is the strategy to go through block three. Blocks four and five are to be determined at a later date.

The low-rate initial production phase will include three lots, amounting to 73 aircraft, for a total buy in blocks one through three of 650 aircraft, at a peak rate of about 60 aircraft per year.

Low-rate initial production is currently scheduled for fiscal year 2007, and in fiscal year 2008 we will start to begin to get deliveries of these aircraft. And then the first unit equipped (FUE) will be available in fiscal year 2009.

Comanche is an integral part of the unit of action, the Army's new unit of action. It is a brigade-size element. Each unit of action will contain 12 Comanche helicopters. It will be teamed with the UAVs in that unit, and we will talk to them across a tactical common data link that all the services are moving toward. Through

that, it will be able to achieve and share unprecedented situational awareness, and that is what sets it apart from today's common helicopters.

The stealth, lethality, agility, sustainability of Comanche, and its ability to work interoperable with the other forces make it a versatile and responsive asset across the spectrum of conflict.

Next let us turn to the Apache. The mission of the Apache is more of heavy attack. Its mission is to target and destroy enemy forces, day or night, adverse weather, does not matter, supporting the joint commander. And it is built by Boeing in Mesa, Arizona.

Currently we have two models, the A model and the D model. The A model is armed with semi-active laser Hellfire missiles, 2.75-inch rockets, and 30-millimeter cannon. The D model gives the aircraft a much more digitized cockpit. Gives it multi-function displays, better reliabilities. Fire-control radar is another major add. And then a radar-guided radio frequency (RF) missile that it can fire.

These aircraft are organized into battalions and aircraft squadrons. The acquisition strategy now is to complete the 501 D models that are presently being remanufactured from A models.

Each Apache last year flew on the average of 175 flights hours, and since its inception, we have lost 45 Apaches to accidents, and the Class A accident rate was 6.99 per 100,000 flight hours in FY02.

Now let's turn our attention to the Blackhawk. This is the real utility workhorse in the Army. Not only in the Army, but across all the services, you will find Blackhawks or variants of them.

In the Army, the Blackhawk performs the air assault role, and it also acts in general support. And in fact, 24 percent of the Blackhawk fleet in the Army is tied up in the medical evacuation (MEDIVAC) mission. It will also host the new Army airborne command and control system in the near future, and that is basically a flying tactical operations center with five work stations in the back cabin area.

This is built by Sikorsky in Bridgeport, Connecticut. Our special forces also use the Blackhawk, an MH-60K and L variant. And that has got a multi-mode radar—it is further equipped with a multi-mode radar, a fleer, and mini-guns, rockets, Hellfire missiles capable, and it also has an aerial refueling boom on it so it can mid-air refuel.

Currently the conventional forces have two models of Blackhawks, the A model and the L model. Roughly 967 aircraft are A models. We have 500, roughly, L models at this time. And in the development cycle right now, we have the UH-60M model, which is our next version of the Blackhawk. What we are doing is taking A and L models and remanufacturing them into M models.

Currently we are on a five-year procurement buy, also, our sixth multi-year, and that is with the Navy. And over the next five years, the Army will buy 80 more L models and the Navy will buy 82 more SH-60s.

UH-60M begins deliveries in the FY08 timeframe with a digitized cockpit and improved durability gear box, a 701-D engine, and a wide-cord blade. UH-60M can lift 5,300 pounds externally or 11 combat-loaded troops internally.



The acquisition strategy is to buy 20 new M models, remanufacture the 1,500-plus A and L models in the long term, while recapping 193 A to A models at the Corpus Christi Army Depot over the next 10 years.

Blackhawk has averaged 174 flying hours, roughly, last year per aircraft. Seventy-three Blackhawks have been lost since 1988. And the Class A accident rate in the FY02 was 1.63 per 100,000 flying hours.

Now let's turn our attention to the Chinook, our largest aircraft. It is a tandem rotor cargo helicopter with three external hooks, capable of carrying a total of 26,000 pounds externally and capable of carrying 33 combat-loaded troops or 24 litter patients internally. This is built by Boeing at Boeing Philadelphia.

Models today include 429 CH-47Ds and 36 MH-47 special ops aircraft in our current fleet. These are organized in the conventional forces in the companies of 14 aircraft each. And they reside in the corps and the theater level units.

The acquisition strategy now is to take the CH-47Ds and the conventional force and the MH-47Ds and Es, and remanufacture those into CH-47Fs and MH-47Gs. This puts on the SO birds, the special operations birds, it puts on longer-range tanks, multi-mode radar, a flier, and an aerial refueling boom much like the MH-60 has.

Chinooks averaged 139 flying hours last year. And since 1985, 19 CH-47s have been lost in accidents. And the Class A accident rate was 6.78 per 100,000 flying hours. I might add, some of these accidents include combat losses, so it is not just training accidents or things like that.

The Kiowa Warrior is a light-attack reconnaissance aircraft. Was built by Bell Helicopter in Fort Worth, Texas. It is organized into attack battalions, light infantry, and airborne divisions and in aircraft squadrons. Kiowa Warrior can carry Hellfire missiles, 2.75-inch rockets, air-to-air Stingers, and 50-caliber machine guns.

Kiowas flew roughly 240 flight hours last year per aircraft. And since its inception there have been 36 Kiowas lost to accidents, with an accident rate of 5.46 per 100,000 flying hours in 2002.

Now I want to talk a little bit about UAVs. They are used to increase the flexibility and to give it adaptability to the tactical unit commander, all the way from platoons up to the corps level, allowing the maneuver commander to actually extend his reach much beyond where he can today.

The Army has three companies of Hunter Systems presently in our inventory in the field: at Fort Hood, at Fort Polk, and soon to be at Fifth Corps in Germany. A system consists of six vehicles and three ground control stations.

These aircraft have flown more than 7,000 flights, more than 24,000 flight hours. It is a 1,600-pound class, UAV, and it has got a 275-pound payload, has eight-to 12-hour duration of endurance, and it can fly up to altitudes of 15,000 feet. It is built by TRW in California.

The Shadow tactical UAV is the UAV that we are currently fielding. This UAV, we have purchased through low-rate initial production 13 systems, and we have the first rate of full-rate production

ongoing this year for nine more systems. It is in process now. And there will be 19 additional systems in the following years to come.

Each system is a platoon consisting of 22 personnel, four air vehicles per system, two ground control stations and two remote video terminals. This is about a 350-pound class vehicle with a 60-pound payload. It has got a four-plus-hour endurance at 15,000 feet. These systems are fielded at Fort Wachuka, one unit at Fort Hood, and two up at Fort Lewis. The Shadow is built by AAI in Hunt Valley, Maryland.

New UAV program efforts that include extended-range multi-purpose, interim small air vehicle and 160 are on the books, and I will talk in just a minute about each of those.

ERMP is an intended-range, multi-purpose vehicle divisional and core-level asset for reconnaissance, surveillance and target acquisition. It is set to operate at medium altitudes. The interim small unit of UAV is a squad and platoon-level UAV for dismounted troops.

The Unmanned Combat Armed Rotorcraft is a UAV that we are jointly working, along with the Hummingbird, the A-160, with DARPA, the Defense Advanced Research Projects Agency. DARPA has the lead on both those programs now, but we are cost-sharing those programs over the next couple years. And we will get them up to a requisite level of technology-readiness of level seven before we transition them into the Army's typical procurement cycle.

Both of these are vertical takeoff and lift vehicles. These manned and unmanned air vehicles fit together nicely, according to the Trident chart, the last chart that is it in your package. And if you want to take a second and look at that, I will explain the chart a little bit.

There are three axes on there. The top axis is the legacy axis, and that is where the bulk of our fleet is now. It is in sustainment, and it is undergoing the recapitalization programs that I mentioned earlier. For example, the AH-64A models are being remanufactured into D models, just to give you an idea how that works.

They go through selective upgrades, and they also—there are some efforts ongoing, as I mentioned earlier, for the UH-60 for A models to be—for the near term, to be just overhauled to A models. Again, that is the rebuild piece on the bottom.

The objective piece in the center is more the modernization piece, pure modernization. Comanche, of course, resides on there. Our unmanned air vehicles resides on there.

The interim axis on the bottom represents the work that is going on out at Fort Lewis with the striker brigade combat teams.

So there is a delicate balance going on between all three of these axes, and they all come together and we have to ultimately get to the objective force.

The development, production and sustainment or our aviation weapons system are dependent, heavily, on the industrial base. Some of the problems we see in the Army are programs that have with the industrial base are as follows:

One is obsolescence. As we got more and more into commercial protocols, into commercial parts, off-the-shelf items and things like that, we found ourselves more and more a victim of Moore's law, that these things turn over 15 or 16 months. And as a result, we



have had to consciously put in active programs, both in development and also in production, to address obsolescence of parts. We are doing that. We have just done that recently on the Comanche to take care of some parts that were going obsolete. So we fixed those things. But it is a constant thing that we have to be careful about, and we have to build in a consciousness.

Contractor rate increases is another one. Due to the economy over the last couple years, with the way it has been, we have not been, one, able to buy as many systems. And as a result, we have maintained our status quo. We have not been able to increase a whole lot. So the defense sectors remain fairly constant, but the commercial side of the sector has seen some downturn. So when you looked at the whole business base, the defense side of it has picked up more of the pie, so to speak. And as a result of that, there will be additional increases to the defense contracts. This is because of the overhead and so forth that gets spread across the whole base.

Coupled with this has been poor performance, I think. I have seen most recently in some of the retirement funds, the pension funds and so forth, and also in some of the Medicare benefits have been increasing in cost. And these compound the problem somewhat.

Contractor competitiveness is another issue that I see, because it seems to be declining. And that is because of two main reasons: One, due to mergers. Some of these competitors buy out the other.

And as you mentioned, Mr. Chairman, that has happened with the prime contractors too.

The other part of it is that there is a reduced business base. As I said, we have not been able to increase our business base, so we are, in some cases, we are actually buying less than we had been.

Another concern is the reduced quantities that, with new defense buys, when the contractor cannot build as many as he had been in the past, he has to reduce his workforce in some cases. And that causes a problem for the services then, if we were to have to surge, at some point downstream.

Reduced readiness rates is the final one, and that is primarily due to the unavailability of spare parts. In the past, we have had problems, the past couple years, buying at up to 85-percent stockage level, which is where we would like to be. Most recently though, we have done some pretty good work at the depots in partnering and working some of these problems. And we have been able, through lobbying, also to get, I think, some monies into the spare parts business, which is I think starting to turn a corner now.

On the bright side, I think, I should say in wrapping up, that Army aviation is transforming to the objective force. We are syncing our programs with the future combat systems through block upgrades and embracing the new communications sensor and ground support architectures.

Joint tactical radio system (JTRS) is one of the connectivity pieces that we are very high on, and as a result, we are making it an addition as cluster one to all our aviation programs.

Our recap efforts in concert with this are helping us get the transformation and keeping us safe and with acceptable levels of reliability.

Meanwhile, we have got to fight the global war on terrorism, so we are spending our money on that as well. But we cannot overlook or neglect the future. We need to keep our investments in these science and technology areas, because that fuels revolutionary development and keeps us on the right road, I think, to get the best and optimize the manned and unmanned teaming that we see going to happen in the objective force.

Army S&T lies in basic research, which is academia, industry, and government laboratory things. It lies in applied research, which is new technologies such as propulsion, rotor and drive systems, advanced electronics, composites, structures and so forth. And it also lies in advanced technology development, ACTDs—advanced concept technology demonstrations, and the like, much like UCAR that we are doing with the DARPA systems.

Army aviation is responding to today's challenges and is ready to join the objective force.

This completes my statement, Mr. Chairman.

Actually, sir, I think I spoke for Dr. Killion—

[The prepared statement of General Bergantz can be found in the Appendix on page 64.]

Mr. WELDON. Oh, you did?

General BERGANTZ [continuing]. But he is here to help field questions, if there are any.

Mr. WELDON. Well, then you get a plus for that one. [Laughter.]

Thank you, Dr. Killion, for that excellent statement. [Laughter.]

Admiral Kilcline.

Admiral KILCLINE. Thank you, Mr. Chairman. I have a short oral statement, but I wish to submit my written statement for the record.

Mr. WELDON. Without objection.

Admiral KILCLINE. I thank you very much.

Mr. Chairman and other distinguished members of the Subcommittee on Tactical Air and Land Forces, I am Rear Admiral Tom Kilcline. I head Aviation Plans and Requirements, Naval Air Warfare Directorate.

In representing our Navy Marine Corps team here, I am joined by Mr. Tom Laux, who is the Program Executive Officer, Air Anti-Submarine Warfare, Assault, and Special Mission programs. Tom will not have a statement either; I will be talking for both of us. Colonel Ray Schwartz, Head, Aviation Weapons Systems Requirements branch and Headquarters Marine Corps. And Captain Wayne Tunic, Head, Helicopter Requirements, again in the DEirectorate of the Naval Air Warfare.

We are pleased to appear before you to provide an update on the Department of the Navy rotorcraft programs and future technology initiatives and concern. I and my Navy and Marine Corps colleagues and our rotorcraft community sincerely appreciate your interest in our rotorcraft program capabilities and initiatives.

In front of you, you will find a packet showing not only the concept of operations (CONOPS) for our helicopters, but also some specific platforms. I will be followed—my short statement—by Captain

Tunic and Colonel Schwartz, and they will go through each one of those programs with you.

But first let me start off by saying in my oral statement that rotorcraft are vital for the future success of our Navy Marine Corps team. The new global CONOPS organizes the fleet into carrier strike groups, expeditionary strike groups, and surface action groups.

This change involves more than just in-theater assignment of forces from carrier battle groups and amphibious ready groups, the concept also is that the new strike groups will train together and deploy as a cohesive unit. In addition to transitions, enable forces from 19 to 37 independent strike groups.

Navy Marine rotorcraft constitute a common thread that affects the realization of these concepts. It is with this backdrop that we look ahead to transition the technologies required to accomplish our vision.

As you are keenly aware, rotorcraft are an essential Navy Marine Corps deployed force. In support of Navy CPAR 21 concept, maritime forces will provide sea-strike shield and sea-basing capabilities of unprecedented range and accuracy, global connectivity of great capacity and survivability and streamlined logistics to support joint forces throughout the battle space.

With the chief of Naval Operations' approval of Naval Helicopter Concept of Operations in January of 2002, the rotary wing transformation initiative took a major step forward. Simultaneously, the Marine Aviation Campaign plan established a vision for the Marine Corps rotorcraft operations of the future.

Because of the diverse applications and distinctly distinctive battle group missions, the Navy and Marine Corps offer unique solutions to specific needs. However, Naval rotorcraft are required to realize the full capabilities of the carrier strike group, expeditionary strike group and the surface action group.

Additionally, we have included in our plans a vertical takeoff and landing tactical unmanned aerial vehicle, or a VTUAV. The VTUAV will provide additional capabilities to the helicopter force and complement the roles and missions of future rotorcraft.

The Navy helicopter concept of operations, which is already under way, outlines the neck down of the Navy's battle group helicopter force from seven platform type model series to three—the MH-60 Sierra, the MH-60 Romeo, and the MH-53 Echo—with the overall objective of greatly expanding the warfighting capability while significantly reducing cost. This plan capitalizes on the efficiencies of singular maintenance, logistics and training pipelines, while satisfying the needs of both the active and reserve force.

The helicopter concept will change the helicopter force and command structure in order to get the maximum warfighting capability from the total helicopter force and the men and women who will fight with them.

The Marine Aviation Campaign plan is a vision for the Marine Corps aviation to obtain the highest possible combat readiness to support expeditionary maneuver warfare while at the same time preserving and conserving our most precious assets—our Marines and sailors and their equipment.



The Marine Aviation Campaign plan incorporates technological advances, innovative personnel management, balanced operations tempo and operational risk management to make our aviation units more prepared for combat operations.

These two transformational plans are helping to change our Navy today. Yet these plans can only come to fruition with the continued support of the dedicated industry team. Our longstanding partnership with industry has achieved much. These familiar names include Sikorsky, Lockheed Martin, Bell Helicopter Textron, Boeing, General Electric aircraft engines, Rolls Royce, and Northrup Grumman. They and numerous smaller companies form a cadre of suppliers for the Navy Marine Corps team, building platforms and engines, designing systems and tools for complex applications, and investing dollars into research and development.

Although we have seen a downward trend in rotorcraft contractual funding over the last five years, we anticipate a major change from that trend. From 1998 to 2002, the Navy and Marine Corps Rotorcraft Program spent \$6 billion with industry. From 2003 we anticipate through 2008 the business space will triple. The expanded business opportunities exist for our partners in the future.

The Navy Marine Corps transformation is under way. We will continue to encourage our industry partners to seek innovative solutions to the challenges we face in meeting sea-strike, sea-shield, and sea-basing missions of the future.

Mr. Chairman, thank you again for this opportunity to briefly share with the subcommittee the challenges and the successes of the Navy Marine Corps rotorcraft community.

I would like to now, as I mentioned earlier, explore those specific platforms. And following this discussion, we will look forward to answering any questions you may have.

First I would like to introduce Captain Wayne Tunic, who will review the Navy CONOPS and specific helicopter platforms.

[The prepared statement of Admiral Kilcline can be found in the Appendix on page 78.]

Captain TUNIC. Good evening, Mr. Chairman.

If I can draw your attention to the packet that was handed out for the Navy and to slide one. That is our helo master plan and the transition from the master plan to the helo helicopter CONOPS, which the admiral was talking about.

The helo master plan was an acquisition strategy to neckdown the type model series from seven, which you can see the pictures of each of those helicopters on the left side of the slide, to two, which is the MH-60 Romeo and the MH-60 Sierra.

One of the things that brought about the transition from this acquisition strategy to a helicopter CONOPS is the S-3 sundown, and that is the retirement of the S-3 off the carrier. Helicopters will be picking up its role in the anti-surface warfare mission.

The result is an all-860 helicopter fleet, consisting of the Romeo and the Sierra. And as you can see on the slide, the MH-53 is currently under evaluation to determine its replacement and future role.

If I can draw your attention to the next slide there. That is the maritime dominance vision. And one important asset to bring out in this discussion is that these new helicopters have a great deal

of effort put into bringing the best sensors possible for them to do their missions.

On this slide, you can see there the radar that will be in the MH-60R is a multi-mode, high-tech radar. There is a dipping sonar, which is the advanced low-frequency sonar, ISAR—synthetic aperture radar—which is an imaging radar which will be on the Romeo, and an advanced electronic surveillance measure (ESM) system that has a passive detection capability.

Both aircraft, the Romeo and the Sierra, will have an advanced floor on it, and the Sierra will bring a new mission to the battle group and that is the organic airborne mine countermeasures capability, the capability to do mine warfare with the battle group rather than having to fly assets from the Continental United States (CONUS) or deployed overseas to do the mission.

These helicopters will be linked across the battle group with Link 16 and tactical common data link. Link 16 will go between other platforms in the battle group and the Romeo and Sierra helicopters acting as a team, and the tactical common data link is a larger-bandwidth link that will allow us to take these sensors and put that down the data link into the battle group. And the information from those sensors can be passed throughout the battle group.

Next slide is just a road map and shows the time frame of these transitions. And I call your attention to the 2008 time frame. That will be the first combined carrier deployment of the Romeo and Sierra aircraft.

Next slides talk about each of the individual aircraft, beginning with the HH-1 November. Those aircraft are used—

Mr. WELDON. If you could just highlight each of those, rather than go through them all in detail. If there are special points you want to make about any of them, you might want to do that, rather than go through each. Members all have copies of this in their charts. Go ahead.

Captain TUNIC. Yes, sir. The largest point that I will make on these without going through each of them is that most all of these, as I covered in the helicopter CONOPS plan, have a retirement date. The HH-1 will be in 2012. The next slide, which is the Sea King, will be by 2009. The H-46 will be retired by September of 2004. And the MH-53 Echo, we are still working a plan for what the future of that is.

The whole Seahawk series, the Bravo, Foxtrot and Hotel, will retire between 2012 and 2015. The Foxtrot will see longer time in Search and Rescue (SAR) stations as a replacement for the H-3. And then the last two 60-series aircraft is the Romeo and the Sierra. Those are the aircraft that are shown on the first slide that we are transitioning to.

The final slide is the Fire Scout VTUAV. We are now in the development of that. We look at that as a complimentary platform to support the sensors that are on the helicopters that are being built for the fleet.

And that concludes the statement that I have. Thank you.

Mr. WELDON. Thank you very much.

Admiral KILCLINE. And Colonel Schwartz?

Colonel SCHWARTZ. Good afternoon, Mr. Chairman.

The first slide in my packet you have in front of you is a road map slide indicating the initial operational capabilities (IOC) of our aircraft. You will notice that between time frame of 2004 and 2012, the Marine Corps brings to initial operational capability six new aircraft. Four of these aircraft are helicopters. Three of these aircraft, three of the four, are currently down at Pax River undergoing tests, the V-22, our Zulu Cobra and our Yankee Huey.

The next slide graphically depicts for you the aircraft we are transitioning from to and our new aircraft.

The third slide in the packet is the Marine Corps vision slide. Marines are not allowed to go anywhere without a vision, and this is our vision for a future expeditionary strike group that the admiral talked about a little bit earlier. Actually this picture depicts the synergy of two visions, the vision of the Marine Corps all vertical, short takeoff and landing force, and the Naval vision of sea basing.

Sea basing will significantly enhance our capabilities and the capabilities of our Naval force by providing rapid force closure, phased arrival and assembly at sea, selective offload of equipment, tailored for individual missions and reconstitution of the force.

But to fully exploit the capabilities of sea basing is going to require an investment in the advanced aircraft technologies that you see depicted in this picture.

The V-22 is currently funded. It is down at Pax; it is testing. Some of the other aircraft that you see here are quad tilt-rotor type aircraft that would carry our heavy equipment, our heavy lift from those ships long ranges, fast speeds, to the operational areas. Other aircraft might be a fast tilt-rotor or a small fast tilt-rotor to escort those aircraft, an aircraft that has the range and speed to keep up with our transports and with our resupply aircraft.

Going rather quickly through our slides in the aircraft that we have, sir, the first series of aircraft I want to talk about are H-1s. The Marine Corps has divided our H-1s into light-attack squadrons. We currently have six active light-attack squadrons with 18 Cobras and nine Hueys in each. Each light-attack squadron has the capability to provide three detachments of six Cobras and three Hueys to our Marine expeditionary units, which then deploy. Additionally we have two reserve light helicopter squadrons (HMLs) in four detachments: in Atlanta, Georgia; Johnston, Pennsylvania; Camp Pendleton; and New Orleans.

The first aircraft, the first Huey I want to talk about is our HH-1, UH-1N. The aircraft, this aircraft is our battlefield command and control aircraft. You can see the statistics there in front of you. We have got seven HH-1s that act as our SAR aircraft, and we have a total of 93 UH-1Ns. The average age of the Hueys is 29 years.

The next slide shows the Yankee. The Yankee is our replacement for the November. We currently have two Yankees at Pax River undergoing developmental testing. The Yankees at Pax River have flown over 250 flying hours of tests with no significant problems noted. With the new rotor head, upgraded engines and transmissions and a glass cockpit, the Yankee shares 84 percent commonality with our new Cobra, the Zulu. I will talk about the Cobra in a minute.



We plan to replace our Yankees in FY 2006. That is when we start. The Whiskey Cobra, our super Cobra, our close air support aircraft, armed escort reconnaissance aircraft, we have got 189 Whiskies at this time.

Let's talk about the Zulu. The Zulu is replacing the Whiskey. We currently have three Zulus down at Pax River undergoing tests. These aircraft have flown a total of over 500 hours thus far with no significant problems. Again, this aircraft shares 84 percent commonality with the Yankee, which is going to drastically reduce our logistics footprint and significantly enhance our ability to deploy with these aircraft. We plan to field the Zulu again in FY 2006.

The next aircraft on your slide is the VH3D. This is the presidential aircraft, the executive mission flown by HMX1. We have got 11 of these aircraft. The replacement program for them was initiated this year, and an analysis of alternatives was funded and is being developed in conjunction with the development of an operational requirements document that hopefully will be out this coming summer.

The V-22 is our replacement for the CH-46 and CH-53D fleet. As you are aware, this program has had many ups and downs over the course of its 20 year development. Colonel Dan Schultz and his program management office down at Pax River have done an absolutely superb job of turning this program around over the course of the last two years. We currently have four MV-22s in tests at Pax River and two Air Force CV-22s out at Edwards Air Force base. Additionally we are about to add an additional MV test article here shortly.

These aircraft have flown a total of 287 hours of tests since returning to flight. The test is event-driven, and it is also front-loaded. And by that what I mean is that the crucial test points that identify handling qualities and flight characteristics are going to be tested up front. Those tests are going very well, and we expect to have some real good results here this coming May.

The Marine Corps is purchasing 360 MV-22s. The CV is the Special Operations Command (SOCOM) version of that aircraft undergoing tests at Pax River, at Edwards Air Force Base, and SOCOM is purchasing 50 of those aircraft.

The next aircraft is the CH-46, the venerable frog. There is a saying among frog pilots that the last frog pilot has not been born yet, but I am here to tell you he has been born, but he is probably only five of six years old and aging slowly.

The primary mission of our CH-46 is assault support of combat troops, support equipment and logistics and ship to shore. We currently have 14 active duty CH-46 squadrons and two reserve squadrons located in Norfolk and Edwards Air Force Base. We have a total of 228 frogs in our inventory, and the average age of these aircraft is 34.2 years, which is older than most of the pilots that fly them.

The CH-53D is our other medium lift work horse. This is the oldest aircraft in our inventory. It has never undergone a major service life extension program (SLEP). We currently have an inventory of 42 of these aircraft broken down into three squadrons and a fourth replacement air group, a replacement squadron that trains pilots. They are all located in Hawaii. These aircraft deploy on six-

month unit rotations. The average age of these aircraft is 29 years. These aircraft will also be replaced by the MV-22.

CH-53 Super Stallion is our heavy lift work horse, designed for transportation of heavy equipment, supplies for the amphibious assault. Now the combat role of this aircraft was intended to be support. However, because of its tremendous capabilities, we have found ourselves more and more relying on this aircraft as a front-line combat aircraft. The Grady rescue was a good example of that. These aircraft really proved themselves in Afghanistan where they were able to go places and do things that very few helicopters in the world are capable of doing.

We have 161 CH-53s assigned to six active duty and two reserve squadrons plus a training squadron. The average age of these aircraft is 14 years. We are currently in the process of conducting an analysis of alternatives to determine what we need to do to extend the service life of this valuable asset.

The last aircraft I will cover is the VH-60N, our other executive transport aircraft. We currently have an inventory of eight of these at HMX-1. They are out of production, and the structural life limits we tend to reach in about 2015. We are anticipating that as we replace the VH-3Ds we will follow on and replace the VH-60s.

Sir, that concludes my remarks. Thank you.

Mr. WELDON. Thank you.

And thank you all for your statements and for the effort to keep our rotorcraft fleet operational and attempt to modernize it, but obviously the numbers tell quite a revealing story of the fact that we have not put enough effort into modernization. And when you are talking about pilots flying aircraft that are far older than they are, it makes us all realize we have got to do better with our rotorcraft base, both in terms of the industrial base and also in terms of replacing these outdated aircraft that should have been replaced, in some cases, 10 or 15 years ago.

I am going to save any questions I have and let it go to other Members of the committee, so I will start with my friend Mr. Abercrombie from Hawaii.

Mr. ABERCROMBIE. Thank you, Mr. Chairman.

Two principal concerns because of the kind of expenditures that we can expect if we end up, as I believe we will shortly, committing ourselves into something that I wish was being handled another way in Iraq and elsewhere—and I say elsewhere as well. The Philippines, Colombia, Indonesia, all kinds of places could involve enormous expenditures, not just operational expenditures, not just deployment expenditures but requirements with respect to equipment like helicopters that are going to require numbers which I do not see, Mr. Chairman, necessarily reflected in the budget, even in what these intended purchases are.

Now, the reason I cite that to you is that I am saying this in general, is that I have been driven to be concerned about at least two aspects, this V22 and then the Comanche, as to whether or not we can receive definitive, certain assurance, certainty of assurance that we can build these planes, that we can build these craft, excuse me, and operate these craft.

Because if we cannot, then I think we have got to make a decision about what we do in terms of whether we want to continue



our not. We cannot keep putting it off. But concomitant with that decision has to be, do we take and build the reliable craft that has been cited in detail and is explicated in even more detail here in terms of reliability, in terms of years? If something, after all, Mr. Chairman, is older than the pilot that is flying it, the chances are it has proved itself then over time. I for one am not upset with the idea that we build the same thing over again. If it is brand new and has been doing the job and can do the job, but we are not devoting necessarily our funding to that.

So the question—for example, I drove a Checker cab for 25 years, because it was built to last 25 years. I loved that car. It was a tank. Anything that got in the way was sorry about it. It ran beautifully for 25—it went out business because it was too well made. It lasted too long. The cab companies prefer to take the depreciation. They buy a fleet of trash and then run it for five years into the ground, did not service it, did not do a damn thing and then throw it away. The Checker cab was still there.

Well, the same here. There are helicopters here in all the services here that have served the mission well. So my question is, do we—and nobody is going to get punished. It is not like they are going to be yelled at or something.

Do we commit our fiscal resources now into resupplying you with the craft that you have come to depend on and are assured are going to be able to do the job, at least up to the specifications they have, as opposed to continuing to pour tens of millions, if not hundreds of millions, of dollars into craft which may or may not give us some marginal or even exponential capacity to improve upon what mission you already expected the craft should have?

We start with you, General, because you look most eager to answer. [Laughter.]

General BERGANTZ. Well, I would say I think the Comanche, for example, is something that I am very confident that it will succeed now because——

Mr. ABERCROMBIE. But this is my 13th year——

General BERGANTZ. Right.

Mr. ABERCROMBIE [continuing]. On this committee.

General BERGANTZ. Right.

Mr. ABERCROMBIE. This Comanche experiment preceded me on this committee, speaking of being older. And I have been down to see it, and the people—do not get me wrong. The people—I have been down there to see the Comanche and the experimental flying and all the rest of it. People there are dedicated, they are smart, they are purposeful. They wake up every day trying to get the job done. If they could will it into existence the way they want it to be, it would have already happened. But this is my 13th year.

General BERGANTZ. Well, what I would say about that is that we did not fund the Comanche. I mean, I used to be the Comanche program manager, and we just did not fund the Comanche to the levels it really needed to be. And we were trying to do—every time that it was restructured or in the past, we took money out to do one thing or another.

Mr. ABERCROMBIE. You are making my point. I will not dwell on it, and maybe some of these answers will have to come later, because I do not want to take everybody's time. But you are making

my point. Maybe it takes too much funding, and maybe other things are going to be short-changed as a result.

My question really is, General, in your most honest opinion—because believe me, I know Chairman Weldon, he is looking for an honest opinion and he does not hold it against anybody who gives him one, believe me—should we take what resources we have, particularly under the strain that we are going to have with deployments and all the other things that you will be required to shoulder, should we be putting that into building those models which we know work for the purposes that they serve so far, as opposed to continuing the make the 29-year-old plane 32 years old?

General BERGANTZ. Well, I think when I—I would honestly say that I think what we are doing with the 29-year-old plane and making it 32 by recapping it, or remanufacturing it I guess is what you are saying, is—

Mr. ABERCROMBIE. Yes, you are remanufacturing or just build new ones.

General BERGANTZ. Right. If we are faced with that, we can do for about two-thirds the cost of what it costs to do the new ones. And then with the money we are saving we can push that further and buy more of the remanufactured ones which is what we need.

Mr. ABERCROMBIE. Okay.

General BERGANTZ. The remanufactured ones in my mind are perfectly Okay. I mean we are taking them down structure wise on the air frame. We are tearing them all down to the formers, for example, on the CH-47, so we are treating all the corrosion, taking care of all that.

And I think when we put it all back together that we have gone in and we have looked at the 32 or I think 33 major cost drivers on that particular aircraft that have been not reliable and we are redesigning those. So when we put this thing all back together, it is going to be a much more reliable aircraft and it will be like a new-built aircraft. I cannot turn the clock back to zero and make it—you know, zero time it.

Mr. ABERCROMBIE. Okay. And what are we looking at with the Comanche? When are we going to be ready to come to Mr. Weldon and say, we are ready to go?

General BERGANTZ. I am ready to do that right now, sir. We are ready to go. I mean, it is—

Mr. ABERCROMBIE. For sure?

General BERGANTZ. For sure.

Mr. ABERCROMBIE. Okay, what about the V-22?

Admiral KILCLINE. Sir, the Marine Corps is very much interested in the revolutionary capabilities that the V-22 provides. We have taken advantage—

Mr. ABERCROMBIE. Excuse me. General Gray told me that—

Admiral KILCLINE. Yes, sir.

Mr. ABERCROMBIE [continuing]. The first day that I was here. And the reason I have supported it all this time is I came in as a rookie congressman and General Gray came in to see me, which I took as a great honor because he was just about ready to retire as commandant and he took the time to come out. And he walked into my office and told me, "The reason I would like you to support this is I believe it will save lives of Marines, and it will enable us

to do our mission better all the way around," and so I said that is a good reason.

Now, but that was 13 years ago.

Admiral KILCLINE. Yes, sir. The fact that the aircraft very nearly entered the fleet had the mishaps which triggered the technical review, the scientific review of the program. We have engaged all these experts, both with our industry partners and from NASA and from our sisters services. We have created a test program which we are confident fully explores every possible investigation into this aircraft.

Mr. ABERCROMBIE. So much, though, that you want to keep investing money there rather than taking that money and investing it in craft that have already served and are serving the Marines well now?

Admiral KILCLINE. Sir, the capability that the V-22 provides are so much superior to what we have with the CH-46. What we are testing now has to do both with the aerodynamic capability of the aircraft and the reliability and maintainability. We have——

Mr. ABERCROMBIE. Okay, I am abusing my time, but are you also engaged in the remanufacture aspect that the Army is involved in with existing craft?

Admiral KILCLINE. We are with the H-1s, yes, sir.

Mr. ABERCROMBIE. So what is the effect of time? Instead of 29 years old when you remanufacture them, what does that make them theoretically?

Admiral KILCLINE. We are going to——

Mr. ABERCROMBIE. Nine years old, eight?

Admiral KILCLINE. We are going to zero time the air frames and the H1 is going to be remanufactured.

Mr. ABERCROMBIE. How about for the Army?

General BERGANTZ. Yes, sir, what we are doing is giving them another 20-year new lease on life basically.

Mr. ABERCROMBIE. Okay, thank you, Mr. Chairman.

Mr. WELDON. Thank you.

Mr. Gibbons.

Mr. GIBBONS. Thank you very much, Mr. Chairman.

And my role here is to look out for Guard and Reserve units. It is a big part of what I feel is an important role because of the operational tempo and utilization of our Guard and Reserve forces. But the active duty components start to cascade down to the Guard and Reserve, whether it is UH-60s, CH-47s or the age 64, and they will not need to modernize the new ones, they will be the non-modernized ones.

My concern is that we have now given our Guard and Reserve forces aircraft that are nearly or soon to be legacy aircraft. And my question to General Bergantz would be, are the funds projected in the Army budget, future budget I would say, to upgrade these aircraft to the latest series?

General BERGANTZ. I am going to let my colleague here help me on that one.

Colonel BENDYK. Sir, as we transition the Army and go to the National Guard, we have not decided exactly——

Mr. WELDON. Could you introduce yourself, please, for the record?



Colonel BENDYK. I am Colonel John Bendyk, Chief of Aviation Division within the G-8 procurement.

The transition for the National Guard force structure has not been determined yet. Right now we share CH-47s are the same age between both the active and the Reserve components. We have a total of 139 AH-64 Alphas, four AH-64 Deltas in the National Guard. The end state is going to be for 203 AH-64 Alphas and 63 AH-64 Deltas.

Of the Alpha fleet that is there, we are doing an A to A recap. We are modernizing. We are recapping the aircraft, bringing down its age, but we are not modernizing any of the systems on board.

As far as the CH-47 fleet, eventually we will get them all to CH-47 Fs just like the active component. In regards to UH-60, sir, currently we have 165 L models in the National Guard, 687 total UH-60s there. They do have the HH-60s, the newest MEDEVAC aircraft.

One of the considerations, and when we field the Guard force, is we look at the tempo of operations (OPTEMPO) between the Guard force and the regular force, and we look at how much we have spent per hour. It is cheaper for us to put the modernized aircraft, the new airframes into the active component because we almost double their flight time.

Mr. GIBBONS. So what you are saying is the Guard can maintain old, difficult-to-maintain aircraft better than the active-duty components can?

Colonel BENDYK. No, sir, they do not fly as much, and therefore it is cheaper to do it that way.

Mr. GIBBONS. Well, it would seem to me the cost per hour should be about the same.

Colonel BENDYK. Sir, the sea-ac rates do come out to the same, but the actual cost never meet those rates.

Mr. GIBBONS. However you look at it, I will accept your term.

Let me talk about the Guard RAID mission. You know, that is the reconnaissance air interdiction detachment. And these are flown with OH-58 aircraft.

There is a very real military and civilian program that these are involved in, I should say. Their mission profiles, drug interdictions, especially in homeland security.

I guess my question is, would it not behoove the United States Army to urge Congress, considering the counter-drug operation, considering the homeland security operations, to appropriate funding in a sufficient quantity for replacement of these aircraft because the OH-58s are—they are on their last leg.

Colonel BENDYK. Yes, sir. When the Army decided to transition, one of the things the Vice Chief of Staff of the Army did was sent to Office of the Secretary of Defense (OSD) the fact that we do plan on retiring all the legacy aircraft, our UH-1s, AH-1s, OH-58s as well. The goal was to retire all the UH-1s by the end of 2004 and all OH-58s by the end of 2005.

We do have certain aircraft that we cannot retire. We have aircraft within the test community that we need to buy replacement aircraft for. We have aircraft that are combat training centers for operations & Control (O&C) duties that we need to fly for and—

Mr. GIBBONS. Well, let me ask this brief question. Are you considering a commercial off-the-shelf replacement for the OH-58, as a cheaper, less expensive version replacement?

Colonel BENDYK. Sir, we are looking at a cheaper version to bring to the Aberdeen Test Center (ATC's) and Army's Test and Evaluation Command (ATEC) by the year 2008, yes, sir.

Mr. GIBBONS. 2008.

Colonel BENDYK. Yes, sir.

Mr. GIBBONS. Let me ask one just final question, if I may, Mr. Chairman, and it has to deal with the CH-47D fleet, because you are modernizing all of the Ds going to Fs—not all of them, excuse me. You do not take into consideration modernization of the special operations 47s, do you?

Colonel BENDYK. Yes, we do sir.

Mr. GIBBONS. You do? So those are going to be modernized.

Colonel BENDYK. Yes, sir.

Mr. GIBBONS. Are you reconfiguring all of the D models to F models?

Colonel BENDYK. No, sir.

Mr. GIBBONS. Why? You can exclude special operations ones.

General BERGANTZ. Yes, just on the conventional force, I believe it is about 150, roughly, that were not being done, and it was because it was, we just did not have the funding to do it. So we did what we could.

Mr. GIBBONS. Well, will these eventually be done?

General BERGANTZ. Hopefully in the future we can do them. We would probably be at the tail end of the program we have now.

Mr. GIBBONS. So in the FYDP, future year defense planning—

General BERGANTZ. It would be beyond, it would beyond—

Mr. GIBBONS. Beyond the FYDP.

General BERGANTZ. Yes, sir.

Mr. GIBBONS. Thank you, Mr. Chairman.

Mr. WELDON. I thank the gentleman.

Mr. Ortiz.

Mr. ORTIZ. Thank you, Mr. Chairman.

General Bergantz, you make in your statement, and I do not know whether it was Dr. Killion who made the statement, but you mentioned in your written testimony that we have reduced readiness primarily due to the unavailability of parts.

Now, I know that we have had several joint ventures between different companies and we have partnered with some of them.

General BERGANTZ. Right.

Mr. ORTIZ. But we still have a short supply of parts. What do you see as to the future of this arrangement?

General BERGANTZ. Well, I see this in the last two years starting to turn the corner, sir. It is getting better, I think. Last year we asked for nearly \$900 million, I believe to buy spare parts and we did not get that much, but we got a good slug of it. And then this year, I think we asked for nearly another billion dollars to buy spare parts. And this year we have almost received full funding on that.

So the contracts are being let through Army Materiel Command (AMC) and through the depots and so forth to buy these spare parts that we need. But we will not get well right away because

those contracts have lead times and it takes a while to get those parts.

You mentioned the partnering arrangements. We already have negotiated and signed partnering arrangements with General Electric (GE), for the engines, with Boeing and with Sikorsky. I have my program office right now looking at a similar arrangement as the GE one with the Honeywell folks to see whether we could bring Chinook engines in there to do the same kind of thing.

I think if we do that through the partnering arrangements we would be able to speed up the turn-around times on these overhauls and improve the situation.

Mr. ORTIZ. And of course you know the story of the Apache. Who were the one that were able to fix it when they were grounded? I think that we are getting ready to go to war. What kind of backlog of maintenance work do you have on those helicopters that we might need?

General BERGANTZ. All the helicopters that we have deployed are in very good shape. We pulled most of the phases and so forth before they went. We have extra aircraft in theater, in case we have to pull a phase or do unscheduled maintenance in theater. I think we are in pretty good shape, sir, in that respect.

Mr. ORTIZ. One of the things that we talked about this morning at another hearing was that during the Persian Gulf war, there was one contractor to 40 military personnel. Now we understand it is one to 10. And if we go to war, my concern is, as you well know, that in Colombia, we are assisting the Colombian army. There were three civilians who were taken hostage. What do you anticipate—and maybe you cannot answer this question—how many contract workers will be on the war zone?

General BERGANTZ. I do not know how many, sir, but I know that there is a fairly good amount of them there. But I also know that they have, that the mobilization stations before they went, they received training. They were taught how to use their gas masks and all that kind of stuff. They were given the same equipment that the soldiers had. And they have also been given force protection by the units that are over there.

So I think we are taking the prudent measures that the best as we can to take care of those people.

Mr. ORTIZ. One of the things that was very disturbing, Mr. Chairman, was that their alliance is not to the commander on the field. Their alliance is to the contractor who hired them. Before they decide to go on strike, what happens then?

General BERGANTZ. Well, that is a difficult question.

Mr. ORTIZ. It could happen.

General BERGANTZ. It could happen, but most of these people have gone over there willingly, have volunteered to go, and some of them even I think have a reserve component status. So another angle that we could look at in the future, would be to try to take contractors who were in the reserves and activate them and have them go over in that role.

Mr. ORTIZ. Thank you, Mr. Chairman.

Mr. WELDON. I thank the gentleman, and without objection.

The gentleman, Dr. Gingrey from Georgia.

Dr. GINGREY. Thank you, Mr. Chairman.



General Bergantz, I want to direct this question really to you, because of some of your remarks in your statement. The chairman initially spoke of his concern about the age of the various rotorcraft and described some of it as being sort of long in the tooth, I think is the way he put it, and also his concern about the lack of funding for Research and Development (R&D).

Now you mentioned to us the accident loss rate of the various rotorcraft planes, and I think you said there were 73 Blackhawk losses over the last how many years was it, General?

General BERGANTZ. That was since 1985 I believe.

Dr. GINGREY. Since 1985. But of course what we kind of see anecdotally as the general public and as a Member, just within the last three weeks, we have lost about 15 men and women in training mission crashes of Blackhawks. And as you said in your testimony, as some of the critical issues affecting all Army aviation today, you mentioned obsolescence, you mentioned contractor rates increases, contractor competition, mergers and acquisitions, reduced production rates on the ability of our manufacturers to maintain a fully staffed and trained workforce. You talk about readiness rates are primarily due to unavailability of spares and repair parts.

I mean, I am just wondering what the reality is of the air worthiness of some of these rotorcraft vehicles and particularly the Blackhawk. Could you address that for us, please?

General BERGANTZ. Yes, sir. No, the Blackhawk is absolutely air worthy. It is a very good aircraft, and Sikorsky builds a terrific aircraft really. I mean, it is a work horse. It actually flies probably about 40, 50 percent of the flight hours in the whole Army fleet. So it is really doing a yeoman's job out there.

In terms of air worthiness, like I said, when we take the Blackhawk in an A model or an L model and we remanufacture it into an M model, we are doing a lot of selective upgrade work to it as well as taking it down to the formers and stringers and all that sort of thing and treating corrosion and that like.

We are also looking at all the—like I said, a myriad of different components on there that have been bad actors, so to speak, and that have given us problems in the past and have continually had to be removed and replaced. So we are going to take those out. We are taking them out right now, redesigning them and putting a newly redesigned one in.

I would say that once we remanufacture each of these aircraft, Apaches—and we are seeing it on the Apache. I mean, we are 284 aircraft through the 501 aircraft right now on the Apache line, and the D model is showing much better readiness rates than the A model.

Similarly the L model Blackhawk was showing better readiness rates than the A model. So when we brought these aircraft back and done things to them, put a new engine on and that kind of thing, on the Blackhawk we are going to put a new 701B engine. I think these kinds of things are going to make its air worthiness even better.

I quoted you statistics on class A accidents for FY02 for all the difference aircraft. I have got them all the way back to 1998. On the Blackhawk in 1998 it was 2.43. In 1995 it went down to or 1999 it went down to .95. In 2000 it went down to .41, back up to

.84 in 2001 and back up to 1.6 in 2002. So all these aircraft are the same. There is no real trend there. They kind of bounce around.

Some of what we are seeing right now also is the combat losses. We lost a couple Blackhawks. We lost one down in Colombia, the Colombians were flying down there. They had 22 people on that aircraft when it went down. It was not designed to carry 22 people.

Dr. GINGREY. Thank you, General.

I yield back the balance of my time, Mr. Chairman.

Mr. WELDON. I thank the gentleman.

The gentleman from Louisiana Mr. Alexander is recognized. No questions?

The gentlemen from South Carolina is recognized.

Mr. SPRATT. Thank you, Mr. Chairman.

And, General Bergantz, I was in Kuwait in November and I saw the capability of the Predator and the UAVs, and I was really encouraged, because when I went back three weeks ago and met with personnel from the third infantry division, it made me feel good to know that we had UAVs as a means of reconnaissance and surveillance for them. And it just really gave me a really good feeling for them.

And I was delighted to see that there is the Hunter and the Shadow. Are these deployed now and what is the status of them?

General BERGANTZ. Yes, sir. The Hunter systems are—we have three of those systems deployed right now. One is going into Fifth Corps and one is—let's see, one is in Fort Polk and one is at Fort Hood. A system consists of six air vehicles and three ground control stations per system. So those are deployed in those areas right now.

The tactical UAV, the newer one that we are buying, the smaller air vehicle, we have four of those systems deployed right now, two at Fort Lewis, working with the striker brigade combat teams (SBCTs) up there, one at the school house at Fort Wachuka, training the people how to fly, and then one down at Fort Hood.

Mr. SPRATT. And what about rotorcraft? Are those still in the developmental stage or is that—

General BERGANTZ. They are still in the developmental phase. We have two programs that we are jointly working with DARPA, the A-160 Hummingbird and the UCAR, the unmanned combat armed rotorcraft. Both those programs will run probably another five or six years each until we get them up to a technology level where we can transition into the normal acquisition system.

Mr. SPRATT. I just found those extraordinarily intriguing but more as safeguards for our troops and it made me feel very, very good as to what they may be facing in the future.

I would also like to comment to back up Congressman Gibbons of Nevada, and that is that I have an interest in the National Guard and Reserve units and we have a keen desire that they have the latest equipment. I know that from my experience working with the Air National Guard in South Carolina, that with the latest equipment that the Guard has performed so well and in fact was deployed two weeks ago. So I have a real interest in that, and I appreciate all that you all can do to upgrade the Guard and Reserve.



And I have no further questions. I yield the balance of my time.  
Mr. WELDON. I thank the gentleman.

General, and for the rest of the panel, maybe my observation is incorrect, but it seems to me as we look at the various platforms we have in the military and perhaps it is because of the amount of troops carried and the kind of missions they are undertaken with rotorcraft, but it seems like, if you add it all up, probably the greatest loss of life in casualties we have comes from accidents involving rotorcraft.

Would that be a correct assessment, compared to fighter aircraft and ships and so forth?

General BERGANTZ. I would say that is probably true. I think a lot of it has to do with the environment they operate in, down in nap of the earth, in the trees and at night, bad weather, and many accidents are weather-related.

Many of the accidents we have experienced most recently have been because when the aircraft landed in a desert kind of environment, you had the blowing dust and so forth, and they lost visual contact with the ground and then they broke a landing gear or that kind of thing.

Mr. WELDON. But, General, isn't that a reason why we should be spending perhaps more money on cutting-edge research, because of the kinds of conditions that these aircraft are being asked to perform in?

And along that line, let me ask first of all, from the standpoint of the military and this would include DARPA, how much R&D money do we spend that is not specifically tied to a program? How much basic rotorcraft R&D money do we spend each year?

Mr. KILLION. It is a growing amount at the moment. This year it is on the order of just short of about \$100 million if you add up—

Mr. WELDON. Not tied to a program now.

Mr. KILLION. Right, on basic research, applied research and then advanced technology development. Depends on whether you consider a program like the unmanned rotorcraft vehicles with DARPA as a specific program or—I consider part of the research program.

So if you look at that, that is just about \$100 million in the coming year. It grows to well over \$150 million over the course of the President's budget. So we are increasing our investment in rotorcraft technology, specifically in the area of UAVs.

Mr. WELDON. Should we be spending more money in rotorcraft R&D, or is that about right?

Mr. KILLION. We are spending I think as—we have to balance across all the investment areas that the Army is challenged with. Of course we have the future combat system, our new systems, our new ground forces as well as the soldier, medical issues, everything else.

So I believe our investment in rotorcraft is a sound one. The basic and applied research really apply to both the unmanned air vehicles and the manned systems. We have really increased in the event technology development area our work.

Mr. WELDON. The reason why I asked the question is, as we talked about that, perhaps the largest casualties we have is because of the accidents or the shooting down or the other incidents

involving rotorcraft. I would think that should be a very large part of our research budget.

NASA, I am also a senior member of the Science Committee. We had a hearing last week with NASA Ames. They requested zero dollars for rotorcraft research in fiscal year 2003 and zero dollars for fiscal year 2004, although they are trying to take credit for some matching funds for the Army.

Is that about the right level for NASA to be spending? I am going to ask the industry groups. Is that the right amount for this technology and for this risk that we are placing our soldiers and corpsmen into?

Mr. KILLION. Well, I—the good news is that we have recently just signed a update to our joint agreement with DARPA—or with NASA, our joint partnership that we have had traditionally for years since the 1960s. And the Army is about to sign General Kern, the commander of Army Materiel Command, will be signing on the Army side on that agreement.

We are working out the details of what the level of co-investment. We would certainly like to see NASA invest at levels that allow them to provide the expertise and the infrastructure that they traditionally supply to that partnership to make sure that there is a healthy technology base for rotorcraft, that includes Army needs as well as more civilian applications.

Mr. WELDON. But do you think zero dollars is the proper request?

Mr. KILLION. No, I do not believe zero dollars is the proper request, sir.

Mr. WELDON. Well, I guess what bothers me is—and we all have to make tough decisions. That is what we are here for. But if you look at where we suffer the most casualties in the most difficult circumstances, it is with the people that we asked to serve on our rotorcraft platforms.

Doesn't it seem logical then that that is where we should put the bulk of the investment dollar to help reduce those incidents, to help improve our maintenance rates, to help increase the efficiency of the aircraft?

To me that is where the largest loss of life and the largest casualties are coming from, partly because of what we are asking them to do. That is where the money should be going.

Mr. KILLION. And it does represent a healthy portion of our S&T investment overall, I must say, because we have invested over the years and continue to invest in issues like the sensors that you would need to avoid those kinds of incidents where you are operating close to the ground in nap of the earth flight and in landing. Improved rotor blades, improved structures for the vehicles to protect against—to increase crash worthiness for example or air crew survivability in the case of some kind of incident.

So I believe we are making the right kind of investment in our rotorcraft fleet, from an S&T perspective.

Mr. WELDON. I am going to ask that same question of our industrial leaders so I would ask you to be prepared to respond.

Let me ask a question about the V22, since it has been ratherized on a regular basis by certain individuals who do not want to look at the facts.

Is it safe to say that there are no technology problems, that they were just engineering challenges, the two incidents we had, one involved I believe a software glitch and the other the training necessary for dealing with the vortex ring state? Is that correct?

Mr. LAUX. Yes, sir. It is not a question of technology. It is a question of presenting the aircraft status to the pilot in such a way that he can properly fly the aircraft. We have been getting a lot better information to the pilots. We have been redesigning the man machine interface.

All the testing we have going on at Pax River has borne out that these changes have, in fact, been providing the needed capabilities. And we look forward to continuing the testing, continuing the exploration, answering all these questions and moving ahead with the program.

Mr. WELDON. The current grounding of the four aircraft was due to a subcontractor problem, a quality control problem which was caught and that is the good news. It was caught before it affected any aircraft. Would you explain that just for the record so we have it in the record?

Mr. LAUX. I would be happy to, Mr. Chairman. We found during a manufacturing test at the Boeing Philadelphia site, a leak was found when they were doing the initial fuselage manufacture. In running down the circumstances with that small indication, we went back to the manufacturer of the hydraulic tubing. Did not satisfy ourselves that that sub-tier vendor had in fact the consistent quality control that we demand on the program.

We went back and looked at the flying aircraft, and even though we had absolutely no indications that the tubing was below standards, we determined that the prudent thing to do was to replace those tubes on those aircraft. We are in the middle of doing that right now. We have alternate suppliers already delivered the goods and we will be flying again in about another 10 days.

Mr. WELDON. Did we fire that supplier that was giving us faulty product?

Mr. LAUX. Yes, sir. We have got alternate suppliers. The Boeing and Bell companies found readily available manufacturers of good-quality material, and we have had no issues whatsoever in installing the new known-to-be-good-quality tubing.

Mr. WELDON. Well, I applaud you for that and I applaud the contractors and the Corps for that, because we cannot afford to have a quality control problem with any component in these aircraft. Because as you know, we are at a point in time where another incident, heaven forbid it would ever happen, would perceptually cause major problems for the program.

And these subcontract manufacturers have got to know that they are going to be held to the highest possible standard, and let the word go out from this hearing. If they cannot do that, they better get out of the program, because we cannot afford new problems.

So I applaud you all for catching that glitch and getting it resolved and for firing the contractor, and I appreciate that quality control.

With that, we want to thank you all. We might have some questions for the record. We would ask you to respond to those. Thank you for the great job you are doing. I appreciate it.



General Bergantz, as you know, I want to work with you on some initial focus on rotorcraft and look forward to talking to you about that, but thank you for your leadership as well.

And, Admiral, the same, and both of you for coming in and for your excellent testimony as well as the others who testified.

With that, you are all excused, and we will welcome our second panel to the podium.

If we could now have Rhett Flater, John Murphey, Roger Krone and Dean Borgman come forward, we will begin the second panel.

Gentlemen, we welcome you all here. We apologize for the late hour. We just want to prove to you that it is not just the private sector that works late hours. We do here as well. Thank you all for being here.

Your statements will be entered into the record so we would ask you to make whatever comments you would like to make and then leave time for us for some questions. So we will start with Rhett Flater from the American Helicopter Society.

Rhett, it is good to have you here.

**STATEMENT OF MR. M.E. RHETT FLATER, EXECUTIVE DIRECTOR, AMERICAN HELICOPTER SOCIETY INTERNATIONAL**

Mr. FLATER. Mr. Chairman, thank you very much, and Mr. Abercrombie, we also thank you and the other Members of the subcommittee for being with us here at this late hour. I provided written testimony and you have already indicated that it will be included in the record, so I will just speak to a few high points I think and take maybe five minutes of your time.

Our industry is relatively modest in size but we fulfill and address critical national needs. Helicopters perform public service operations such as emergency medical service, search and rescue, law enforcement, fire fighting, resource development and priority transportation. And more important, the rotorcraft industrial base supports national and homeland security needs for improved mobility and these are needs that cannot be fulfilled by any other mode of transportation. We are a subset of the U.S. industrial base. The combined revenues of the major air frame manufacturers, Bell, Boeing and Sikorsky seated next to me or their CEOs, have ranged from about \$5 billion to \$6.6 billion during the past five years.

Their employment levels have fluctuated from 27,200 to the current 24,000. Boeing sales are entirely military related. Sikorsky manufactures products for both the military, primarily the military, but also civil markets. Bell Helicopter sales have historically been spread 50-50 between military and civil. Now this U.S. industry also incorporates a large subsistence supply base and this spans critical fields such as propulsion, avionics, communications to armaments. Many of the members of the audience sitting behind me are representatives of this supply base who show a great interest in these proceedings, Mr. Chairman.

Foreign military sales by the major U.S. air framers comprise about a third of their total worldwide sales. In fact foreign sales have been essential throughout the decade of the 1990s. They have maintained warm production lines at Bell, Boeing and Sikorsky. According to aerospace industries association, helicopter exports in 2000 were about \$764 million. Our industry's net contribution to



the current account trade balance was about \$275 million. Now Mr. Borgman and Mr. Murphey and Mr. Krone will speak to the specific programs, but I would simply observe that for the U.S. rotorcraft industry, there have been no new starts within the last 12 years.

The industry has largely survived and to some extent prospered based on remanufacturing aging airframes. I am a former Marine pilot. I served in Vietnam in 1967-1968. I flew CH-46s in combat. Those same CH-46s, those same serial numbers are flying today 36 years later. And so Mr. Abercrombie, these are Checker cabs. They are a pretty reliable machine. They are really great. The same goes true for the Blackhawk and for the CH-53 and the UH-60 and so forth, but these aircraft have long, long, long lives.

Turning to Europe, I would like to observe that European technology in areas such as blade design, composites and bearingless made rotors, transmission design sensors and hums is just as advanced as U.S. technology. In some cases, as in noise, it probably surpasses that of the U.S. manufacturers.

The major European manufacturers Agusta Westland and Eurocopter are aggressive in pursuing international orders. Recently, they have introduced several new products, competitive with U.S. rotorcraft. These include the EH-101, manufactured by Agusta Westland, the MH-90, made by a four European nation consortia, including Eurocopter and Agusta Westland, and the Tiger Attack helicopter, manufactured by Eurocopter.

These military products are racking up sales across Europe and increasingly winning international competitions such as the Nordic Medium Lift and the Australian Tac competitions.

The military rotorcraft market is global in nature, and to sell products abroad, aerospace companies have to offer really significant economic offsets to the purchasing government. So U.S. primes are teaming with European and other local companies. An example is Boeing's partnership with G.K. and Westland, now Agusta Westland, on the WH64D long-bow Apache for the British Army.

In the same manner, European primes are teaming with major U.S. defense firms to meet future DOD needs. One example is Agusta Westland has joined with Lockheed Martin to offer an Americanized version of EH-101, known as the US-101.

Now compared to the U.S., European host governments consistently and heavily subsidize rotorcraft research and development. European government test facilities are modern to state-of-the-art, compared to those here in the United States. Examples include the DNW Netherlands and Germany wind tunnel and Italy's new crash test facility and its new icing wind tunnel. These are both located in Padua, Italy.

Now, basic rotorcraft research, Mr. Chairman, is in decline in the United States. Appendix III to my testimony is the society's best estimate of the state of Department of Defense rotorcraft science and technology and NASA research and technology programs for the period 1994 through 2003 with projections for the years 2004 through 2007.

Now, I am going to save you from having to dig through that spread sheet. I am going to show you this chart. But as this chart

illustrates, during the period from 2001 through 2003, rotorcraft research performed by the Department of Defense and NASA has declined from \$113 million to \$56.3 million, mostly because of NASA's failure to fund rotorcraft research.

Now, one result is the fact that long-term cooperative efforts between NASA and the Department of Defense and rotorcraft research, especially the 1969 Army-NASA joint agreement, have been underlined by NASA's failure to fund rotorcraft research in fiscal years 2002, 2003 and 2004.

Now as you are aware from the previous testimony and previous panel, several weeks ago the NASA leadership offered to restore \$50 million in fiscal year 2003 funds to support Army-NASA joint research conditioned on the Army funding a similar amount. This is a step in the right direction, but with full costing, it represents about 25 percent of the research investment previously made by NASA.

There are some findings by the Commission on the Future of the U.S. Aerospace Industry that I think are especially relevant to this industry.

For example, there is a major workforce crisis in the aerospace industry. Our Nation has lost about 600,000 scientific and technical aerospace jobs in the past 13 years. What remains, and this is reflected in the membership of my society, is an aging work force which will largely retire in the next five to 10 or 15 years.

The industrial base is in decline, as mergers and consolidations reduce the number of primes, as well as the supplier base.

Aerospace is a technology-driven industry. It is pretty dependent on defense research, development and manufacturing. But for the last 13 years or so, we have seen aerospace procurement by the military fall 53 percent. The Department of Defense also reduced its investment in research development, development, testing and evaluation by 20 percent from 1987 to 1999.

Third point, maintaining a world-class national aerospace research development, testing and evaluation infrastructure is really important to ensure that this country's research programs can be performed successfully. Yet much of this infrastructure is now today 40 to 50 years old and it is marginally maintained.

And as I previously indicated, Europe's infrastructure is state of the art. By comparison, NASA has suspended all operations of the 40-by-80 wind tunnel located at NASA Ames. They have also threatened to close it permanently and they have also announced the imminent closure of this country's only crash safety test facility located at NASA Langley. And what this means basically is that crash safety tests that are now planned for the Comanche and for the joint strike fighter in 2005, they are either not going to be performed at all or they are going to have to be performed over in Italy. That is the choices we have.

Now, examples of possible areas of NASA DOD research which I guess our society believes should be funded include a couple of the following. First, we think we need to investigate and research concepts for innovative new configurations which can radically improve rotorcraft speed, affordability and mission effectiveness.

And that, I think, is the answer to Mr. Abercrombie's question. It is why we need new technology. We need to exploit the capabili-

ties of the future. We need to improve range, speed, payload, reduce costs. Those kinds of things are vital.

Information computing technologies can result in safer, more affordable and environmentally friendly helicopters and more effective and survivable military systems. Active and adaptive controls is another issue. Noise-reducing design methods. We can reduce noise by 75 percent. Design tools. We do not have the design tools that the fixed wing industry have. This could reduce development time by 50 percent.

So these are areas where we think some research ought to be done.

NASA research and Army research is pretty highly leveraged. They basically match each others investment. Under the national rotorcraft technology center (NRTC), that investment is again matched by industry, providing 4-to-1 leveraging for both NASA and the Department of Defense. So NRTC is there. It is another wonderful vehicle.

And companies such as Bell and Boeing and Sikorsky and their team members and their supporting suppliers, they are pretty innovative companies. They have responsive and can-do senior managers and proven and experienced management teams which I think partner well with our customer. And when they are called upon, as they will be shortly, they are capable of responding with alacrity to national security and civil market needs.

So in conclusion, I just have three short recommendations.

One, I think the Department of Defense and NASA should be directed to make further investments in basic 6-1, 6-2 and 6-3 research.

And to answer your question, Mr. Weldon, for 2003, Army DOD 6-1, 6-3 research is \$56.62 million. I personally believe that is inadequate, especially in light of the fact that a significant portion of that money is now funding unmanned research, which is very important, but it is crowding out investments in manned helicopter research. We need to do both. We need a more holistic approach.

And I am not talking about evolutionary improvements in the Apache or the Blackhawk and those kinds of things. I am talking about revolutionary efforts to refine and simplify the rotor system and the control systems and the drive train.

Second, I would say given the importance of transforming our military forces here to 21st-century capabilities, to make them more mobile and more agile, we should be funding, I think, private industry to design, develop and fly a series of innovative vertical takeoff and landing prototype aircraft.

We have got a new requirement coming out that is just burgeoning to the surface with the evolution of the Army to a future objective force. It is called the heavy-lift replacement helicopter. We need new technologies to insert into that platform, and we can do it, doubling speed, range, payload, reducing costs by half.

And finally I think this committee should heed the recommendations of the Commission on the Future of the U.S. Aerospace Industry. Rapid passage of the recently reintroduced Aeronautics Revitalization Act of 2004, we think this will be a really good first step in addressing these national concerns.



Mr. Chairman and Mr. Abercrombie, I thank you very much for your attention, and I look forward to answering any questions that you may have, gentlemen.

[The prepared statement of Mr. Flater can be found in the Appendix on page 95.]

Mr. WELDON. Thank you very much, Mr. Flater.

Mr. Murphey.

**STATEMENT OF JOHN R. MURPHEY, CHAIRMAN AND CHIEF  
EXECUTIVE OFFICER, BELL HELICOPTER TEXTRON**

Mr. MURPHEY. Yes, thank you, Mr. Chairman and Mr. Abercrombie. I will make my comments brief. You have copies of my written testimony in front of you.

I do represent Bell Helicopter, and I am pleased to be here. We have a rich history of serving our nation, both in the military and civil sectors.

We are one of the industry leaders in rotorcraft technology. We pioneered the rotor technology beginning with the XP-3 in 1950 to the XP-15 in the 1970s. Both of those programs were the result of the joint Navy, Army, NASA funding, and the result today is the V-22 rotorcraft that will go into service with the Marine Corps and special operations forces. It is also the result of our commercial 609 that will soon enter service in the commercial sector as the first commercial tilt rotor. It is also the parents of the UAV tilt rotor that will go into service with the Coast Guard.

So part of that rich heritage is the funding in the past of science and technology that led to the kind of capabilities we have today. I am proud of our company and our ability to share in these nation needs.

Mr. Chairman, I do believe that the rotorcraft industry is at a crossroad and that decisions made by Congress in the near term will determine whether the United States maintains its leadership in military and civilian rotorcraft in both of these important markets or whether or not these markets are dominated by foreign companies.

At a time when our Nation depends on the kinds of products that we manufacture, not only for the wars that may be outside of our borders, but also the wars that may be inside our borders with terrorism, we need to make sure that in areas of border patrol, anti-terrorism, emergency operations and disaster relief, that we have the kinds of rotorcraft that serve those kinds of markets. We need to be flexible. We need to make sure that we have kind of the leap-ahead technology that we need.

We need government investment in this technology for us to maintain this kind of leadership. It is very strong on the fixed-wing side of aviation business but it is very deficient on the rotorcraft side.

Economic times, I do not need to tell you, they are turbulent. And the helicopter industry has been not spared, just as the rest of the aviation industry has not been spared by the events of the economy and September 11th. The top-line economic numbers are only a part of what has happened in the capital market side. Big capital expenditures are not being made by our customers, and it is a serious investment risk for our people.



We need a partnership with the government to make sure that technology and the future of this industry remains bright. It is one of the most attractive sectors in the aviation market for the next 10 years, because these are the kinds of products that our Nation is going to need both for military and commercial operations. We need to transform the way we do business as a Nation. Transformation is not limited to the military, but it ought to be a part of how we approach investment in both commercial and civil aviation.

The requirements for our mission expansion continues, and we need those requirements in rotorcraft, science and technology and R&D to keep pace. They have been out of sync. If you look at programs like the V-22 and Comanche that have been in the development cycle for more than 20 years, they are stretched out beyond belief, increasing the cost both for development and increasing the risk of not getting new technology in the hands of our war fighters soon enough. Once programs are started, the funding for those programs is often inadequate. Production rates are low. Quantities are reduced and cost is high as a result of that. That is not a pattern that speaks well for our industry or speaks well for how we serve our industry.

The R&D demand that this industry is needed is not being met. NASA has a charter to fund science and technology for rotorcraft. It is not meeting that responsibility.

Comparison, the French government funds 100 percent of rotorcraft R&D. We are not asking for that kind of participation from our government, but we are asking for adequate funding to keep our technology strong.

In today's marketplace, if you look at the aircraft that are going in to the homeland security assets for this Nation, the border patrol, the sheriff's departments, the Coast Guard, in today's market, more than 50 percent of those aircraft are coming from the French. Aircraft designed and built in France by companies that are partially owned by the French government and funded by the French government for development.

I do not think we as a Nation want to find ourselves in the role of having our national borders and our internal borders protected by aircraft that come from Europe. And the disadvantage that we have as a supplier is those markets, particularly in France, are closed to us. It is unconceivable that the French would ever buy a product from the U.S. for—helicopter product from the U.S. for their national defense and activities.

The V-22, the Bell Eagle Eye, the 609 are great examples of what can be done with adequate funding and with the technology infusion that the NASA could bring. We need help from the government, as I said before, and I think the challenge is there that we can all make sure that we live up to those responsibilities.

Everyone on this industry panel is working very hard within our companies to lean our operations, to reduce cost, do everything that we can to make our products affordable for our government customers and those of us who have commercial customers the same. But we are hard pressed to do that without help in the basic science and technology funding that we need.

I think there is an opportunity here for a new initiative. Mr. Chairman, I would believe that this really should be a national priority. Our development staffs of engineers, scientists and technicians need to have the capability to be refreshed.

We could very well find ourselves with the long development programs in face of competition from European companies that are coming into these markets—and they will be here; they are looking for U.S. partners and they will find them—that we could become subcontractors building aircraft for our military and civil marketplaces that were being designed, developed and built first in Europe and then assembled into the United States.

I think it is time that we have a national center of excellence, that we have a joint effort by the military services, by our universities, by NASA and industry to have adequate funding for science and technology for rotorcraft. Mr. Chairman, I would suggest that \$100 million a year for the next five years would only begin to build the kind of capability and the national asset that we need.

Thank you very much for your attention.

[The prepared statement of Mr. Murphey can be found in the Appendix on page 111.]

Mr. WELDON. I thank you, Mr. Murphey, for your testimony. Mr. Krone.

#### **STATEMENT OF ROGER A. KRONE, SENIOR VICE PRESIDENT, ARMY SYSTEMS, THE BOEING COMPANY**

Mr. KRONE. Thank you Mr. Chairman, Representative Abercrombie, members of the committee. I am Roger Krone, senior vice president of Army systems for Boeing. Before I enter into the record a few short comments, I would like to draw your attention to this morning's "Washington Post." The feature picture on the "Post," if I can read it from the title, is called the "battles of Britain" and shown in the picture is a Boeing-built CH-47 mark II A which we delivered to the Ministry of Defence (MOD) of the United Kingdom around 1990. What is interesting—there are two interesting things in this picture.

First of all, the Chinook, Mr. Abercrombie, was first designed in the 1960s and has been in continuous service ever since. The other aspect is that this Chinook is more capable, all right, as is the newer version of the Mark III which we are currently delivering to the U.K., than the equipment currently in our inventory. And the average age of the U.K. fleet all right, is somewhat 15 to 20 years younger than the fleet currently in the United States Army.

What I would like to do is just reiterate a couple comments that I had in my written statement and then I would pass the mike to Mr. Borgman and leave ample room for questions. I would like to talk about what we are doing at Boeing with regards to research development, design and production in the area of rotorcraft. Boeing Army systems is a growing \$2 billion business which encompasses systems integration work on several major U.S. Army transformational programs, including the future combat systems and the joint tactical radio system.

Our core business also includes our rotorcraft activities centered in our facilities in Philadelphia, Pennsylvania and Mesa, Arizona where we employ about 10,000 skilled and talented people. In addi-

tion we support a widespread supplier base in more than 43 states. Both of these sites enjoy a rich heritage of rotorcraft production that spans more than half of a century. They draw on a legacy of innovation that includes rotorcraft pioneers such as Howard Hughes and Frank Piasecki.

As you know Mr. Chairman, the business that Frank Piasecki started in a suburban Philadelphia garage has grown into a rotorcraft production facility that occupies 3 ¼ million square feet and employs approximately 4400 people. This facility includes a world-renowned 20 foot by 20 foot low speed wind tunnel, a state of the art simulation facility and world class composite manufacturing capabilities. Philadelphia is a great place to do research. At this site, we manufacture and support the CH-47 Chinook. More than 800 of these twin engine tandem rotor heavy lift helicopters are in service with the U.S. military and international customers.

Our Philadelphia facility is also the location of our activities on the RAH-66 Comanche. We are developing this armed reconnaissance helicopter in cooperation with our teammate, Sikorsky aircraft. The twin turbine, two-seat Comanche is the centerpiece of the U.S. Army aviation's modernization plan. The Comanche with its advanced sensor and integrated communications suite represents an essential reconnaissance node in the Army's network center for warfare architecture. Philadelphia is also the center for Boeing's work on the V-22 Osprey tilt rotor aircraft which is currently in low rate production. Boeing has partnered with team mate Bell Helicopter Textron in this program.

The V-22 is the first aircraft designed from the ground up to be the Marine Corps, Navy and Air Force special operations requirements. With the speed and range of a turbo prop and the vertical lift of a helicopter, the V-22 offers unmatched flexibility for the 21st century war fighter. At our Mesa facility, where we have more than 4,100 employees, the focus is on manufacturing and modernization of the AH-64 attack helicopter for the U.S. Army and international customers as well as developing new technologies for the defense industry.

Boeing has delivered more than 1,000 Apaches to customers around the world since the first aircraft rolled off the assembly line in 1983. The AH-64 Delta Apache longbow is the latest version of the combat proven Apache. Its longbow fire control radar and advanced avionics suite gives combat pilots the ability to rapidly detect, classify, prioritize and engage stationery or moving targets at stand off ranges. We are also continuing to investigate the advanced systems, both manned and unmanned and new technologies to support the U.S. military's transformation.

Boeing is currently conducting concept development studies for an unmanned combat armed rotorcraft or UCAR. This U.S. Army DARPA program seeks to develop in a timeless survivable lethal, unmanned rotorcraft for the Army's objective force. Boeing is a phase one contractor and is currently in competition for a phase two award. We are also working on a revolutionary design concept called the Canard Rotor Wing (CRW), that can perform like a helicopter for vertical take offs and landings and is officially an aircraft for high speed cruise. In fact we expect to fly this aircraft early in April of this year. For rotor ring flight, the CRW's reaction drive



rotor wing eliminates the need for mechanical drive train and anti-torque system. That equates to reduced weight cost and complexity. An unmanned version of the CRW could perform a variety of missions, including communications and data relay reconnaissance and logistics resupply.

But the critical question is whether we can deliver on the promise of these and other new advanced rotorcraft concepts, looking at the track record so far, the odds would seem to be less than favorable. For several years, the focus has been largely on extending the life of existing platforms rather than development and production of new built aircraft. The last new helicopter development contract from the Department of Defense was award in 1991 for the Comanche. That represents a gap of 12 years.

In fact our most recent hope, the joint transport rotorcraft program, also known as AMT, has disappeared from the long-range budget plans altogether. In fact we now ask the question, how will the objective force move on the battlefield? Some of us here can recall the futuristic stories of the 1950s that forecasted the vast potential for rotorcraft. Many of those stories predicted we would all have a helicopter in our garage and we would be using it to fly between city centers. But last night, I looked in my garage and there wasn't a helicopter there. More than 50 years later, the vision has let to materialize. There is no mass market consumer base for helicopters.

Boeing used to be in the commercial helicopter business. We employed several hundred people in Mesa, Arizona and Culver City, California. We delivered thousands of single and twin engine helicopters and we advanced the state of the art in technology with such concepts as a rotorless anti-torque system, better known as no tar. However, in the 1990s, we saw our global market share being consumed by subsidized foreign competitors. In an attempt to hold market share, we designed two new helicopters, the MV900 and the MV600 using internal corporate development dollars.

These products were quickly countered by new foreign entrants whose development was significantly supported by their governments. Indeed, after losing money for 10 years, Boeing exited commercial rotorcraft market in 1998. As we have seen the military rotorcraft market is largely evolved from buying new aircraft to upgrades and remanufactures of fielded platforms. At the time, as the time between new products is getting longer and longer, the industry has often been forced to rely on international sales to bridge gaps between U.S. military programs in order to keep production lines warm and retain our skilled workforces. This is exactly what we have done on the CH-47 program in Philadelphia. But this is becoming more and more difficult as a result of increasingly aggressive challenges from our European competitors in markets around the world.

These competitors, bolstered by increasing government support for research and development of military, as well as civil rotorcraft, are offering new products and incorporating technological advances in areas such as rotor blades and transmissions that match or sometime exceed U.S. capabilities.

Rotorcraft technology is a national asset. We have seen how helicopters have contributed to the defense of the Nation and enriched



our lives. Anyone who watches CNN knows how effective they have been in conflicts around the globe and humanitarian missions. The question is, how long can we continue down this path? There are many emerging requirements for rotorcraft. The impact of reduced Federal funding for rotorcraft science and technology work has delayed the accomplishment of national priorities in several vital market areas. Advanced rotorcraft systems to support mobility requirements for the Army's objective force, emerging homeland security applications, runway independent short haul transportation capabilities to relieve congestion at airports and crowds in crowded skies.

Will we be able to meet these new requirements? I believe we have little choice. Increased funding and collaboration on research and development offers a step in the right direction. Without the right investments now, rotorcraft will not be able to fulfill these rules envisioned for them in the future. Industry, college and universities and government, must work together to ensure continued development of the best rotorcraft technology to meet the ever growing needs of our Nation as well as to sustain the competitive-ness of U.S. rotorcraft industry in the international marketplace.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Krone can be found in the Appendix on page 139.]

Mr. WELDON. Thank you, Mr. Krone.

Mr. Borgman.

#### **STATEMENT OF DEAN C. BORGMAN, PRESIDENT, SIKORSKY AIRCRAFT CORPORATION**

Mr. BORGMAN. Thank you, Chairman Weldon, Mr. Abercrombie, appreciate the opportunity to be here tonight to share my perspective on the rotorcraft industrial base in the U.S. I am proud to represent Sikorsky on this occasion. Just one week ago today marked the 80th anniversary of our company. I think that makes it one of the oldest aviation companies in the U.S.

Our founder was Igor Sikorsky and he designed, built and flew the world's first practical helicopter, the VS300 and we have the privilege of continuing that legacy today. By the way, that little factoid earned him, a young man, \$2 million on, if you want to be a millionaire.

Our products as you heard already are currently in service with all of the branches of the U.S. military. Our core product has been and remains the Blackhawk helicopter and its derivatives and they fly a number of different missions for the U.S. Army, for the U.S. Air Force, for the Marine Corps and we also manufacture the U.S. Navy Sea Hawk and the U.S. Coast Guard Jay Hawk and our product is the CH-53 which is in service at the U.S. Air Force, the Navy and the Marine Corps. We also manufacture two different civil aircraft. These include the S-76 which flies VIP transport emergency medical service and airline missions in 40 countries around the world. It also includes the all new S-92, which is a 19 to 22 passenger machine that was recently announced as the winner of the Collier trophy for 2002 which is the aviation industry's highest honor for technology, innovation and excellence.

The F-92 has a military variant, the H-92 which we believe is ideally suited to upcoming Air Force and Marine Corps medium lift requirements and that includes the presidential transport mission that Sikorsky has been honored to fulfill for the last 40 years. Finally, with our Boeing partner, we are developing the Comanche, the next generation stealth reconnaissance and attack helicopter for the Army. The key point that I would like to make today concerns the rotorcraft industrial base and it has to do with our fundamental research capabilities in this country.

Like my industry colleagues have already pointed out, I will caution strongly against any complacency or self satisfaction when it comes to the future of rotorcraft technology. In fact I believe we may already be sowing the seeds of our future demise. The basic reason is very simple. In the technology gains that we see applied in our products today are in large part attributable to the advanced technology work that was done in the previous generation on core rotorcraft science.

Let me speak from some personal experience. As a young engineer in the 1960s, I was hired as one of the first employees of a joint Army NASA rotorcraft technology agreement at NASA Ames Research Center in Mountain View, California. It was a very exciting time. My employer, the Army was already deep into the use of helicopters to support combat operations, but had no facility at that time at which to develop and test the useful technologies, develop new technologies which could lead to new vehicle concepts and unique operational concepts. In other words, they wanted to become a smarter buyer.

NASA at that time was racing to the moon. They had excess test capacity for what it viewed as more mundane aeronautical research and it was a foundation for a great partnership. But it was also an exciting time because we were moving rapidly into important research that advanced the uniquely challenging science of rotorcraft. In the mid 1960s, that was less than 30 years after Igor Sikorsky's first flight in the VS300 and there were still many undeveloped properties of rotary wing flight that needed to be explored further and there are just as many today.

I just want to remind you that this is the year that we celebrate the hundredth anniversary of the first flight of fixed wing aircraft with the Wright brothers flight. It has been 64 years since the first flight of rotary wing aircraft. It would be interesting to compare the investments that have been made in a fixed wing versus rotary wing over the life of their respective developments. I think you would see that the rotorcraft is still a long way from maturity in developing as a technology.

The experiments and tests that we did in that first decade of the agreement between Army and NASA I think had a profound impact on rotorcraft designs and operations. I could give you many examples. Let me just point a couple which I think you will be familiar with.

The advance rotor system that is being developed on Comanche today is based on fundamental work on bearingless main rotor technology that was developed at Ames beginning in the 1970s. The first full scale rotor noise measurements that were made on rotorcraft were done in NASA Ames 80 foot wind tunnel and that

research firm formed the foundation for helicopter noise reduction work that is been going on since that time. The solution to the issues which held back further development of tilt rotor technology in the 1960s were demonstrated in NASA Ames 80 foot wind tunnel and was the basis for the decision to proceed with the XV-15 technology demonstrator aircraft. The XV-15 of course formed the technology base for the V-22 program as Mr. Murphey already described and also pointed out that there would be an no V-22 program today had it not been for the work that was done then.

In short, the industry and our military customers took advantage of the opportunities to deepen our understanding of rotorcraft science and technology. This greater understanding translated directly into new vehicle designs, new applications for helicopters and gave rise to America's unquestioned ability to command the air immediately above the modern battle space.

Contrast that excitement then against the current state of affairs, for example at NASA Ames where national assets like the 40 by 80 and the 80 by 120 wind tunnel facilities are sitting idle for want of money, not for lack of work. And we struggle along with our friend such as yourselves to scrape together funding at even a fraction of historical levels. I recognize nothing is free in life and certainly nothing is free when it comes to advancing the cause of science and engineering.

In the absence of investments today in rotorcraft technology, the helicopters our armed forces are going to use in the decades ahead are going to be no quieter, no safer or fundamentally more capable than the aircraft that are coming out of our factories right now.

While my remarks have focused on military products and military applications, Mr. Slater has already pointed out that there are potential benefits that commercial helicopters can bring to our country as well. It goes without saying that our national air transportation system which is dependent upon fixed wing aircraft deployed from large hub airports is showing its age. One out of every five flights in this country fails to arrive at its destination on time and that ratio spikes even higher in the winter months such as now.

Helicopters offer a tantalizing, a non-runway dependent alternative to fixed wing aircraft over short hauls, but they are limited by social objections to noise levels that many communities still find objectionable and unacceptable. In recent years, helicopter operations in areas as far flung as New York, New Mexico, Nevada, Texas, Washington and California have withered under local and municipal restrictions that are brought on by citizen pressure groups and communities of all sizes.

To cite an extreme example, Boston, a bustling metropolitan center with a chronically dysfunctional airport no longer has a dedicated heliport. There was another evolution that began in Boston a couple hundred years ago. We might see history repeat itself. There is room in our national transportation system for a quieter helicopter but we need fundamental industry wide research on next generation technologies such a blade tips and blade control systems. This is the kind of work that can only take place under the umbrella of a national rotorcraft technology program. While such a technology program could take many forms, as someone who par-



ticipated in the creation of the Army NASA partnerships some 35 years ago, I would argue that we should not overlook the assets that we had in terms of facilities that many of these areas today.

As an example, NASA Ames is home to low and high-speed wind tunnels and rotor and tilt rotor test stands where the rotorcraft industry has tested its technologies for decades. The scientists, the technicians that are there are active participants in the American Helicopter Society which is the premier technical society in the helicopter industry. It has strong connections with the people, the laboratories, the test beds, not only at Sikorsky, but at the facilities of Bell and Boeing, university centers of excellence and other Federal research facilities. These assets and others like them around the country and the people who will oversee them collectively represent a unique national capability.

Whatever additional support Congress or the administration choose to provide to the industry should leverage as directly as possible the existing framework of people, laboratories and relationships. I think this would be both the fastest as well as the most cost effective approach to revitalizing the science and technology infrastructure for rotorcraft development.

I would like to thank you once again, Mr. Chairman, for your intense interest in the health and the future of America's helicopter industry. As today's testimony makes clear, we are challenged on many, many fronts and there is no doubt that we can meet these challenges. There is no doubt that increased investment in the core technologies to make rotorcraft safer, quieter and more efficient are the best strategy to enhance our competitive position in the world marketplace. Thank you for this opportunity.

[The prepared statement of Mr. Borgman can be found in the Appendix on page 167.]

Mr. WELDON. Thank you, Mr. Borgman.

Thank all four of you for your testimony and for your statements and you have raised some issues that we obviously have to confront and address. We will start the questioning off on the issue of trade and competition.

Mr. Murphey, you mentioned that over 50 percent of the helicopters being used in our domestic market for civilian purposes, search and rescue, fire, sheriff and so forth are produced by France and yet I think you also said or one of you said that the French do not allow us to have access to their marketplace to sell our helicopters.

I find that totally offensive and would ask you for your comments and suggestions about what we can do, is it just because of their governmental subsidies or are there other reasons why that phenomenon is taking place. And for the other witnesses who are manufacturing some platforms that perhaps could be sold to other countries, I want to ask you the question. I know that I think both Sikorsky and Boeing have had some interest in perhaps selling some platforms eventually that are on what we call the munitions list. And whether or not that is an unfair disadvantage. Perhaps there are sales that we could make to countries like China of non-military variance of platforms that you build that could provide some additional opportunities for economic growth in our industry.



Are these other countries selling similar products in countries like China and should we in fact change the way that we look at the munitions list relative to helicopters. So I will let any one of you respond to those two points.

Mr. MURPHEY. I would be happy to start. First of all, I want to make it clear that I believe in competition and I believe in world-wide competition but I expect that competition to be played on a level playing field. We are the only U.S. company now that has a broad product line both in commercial and military. Half of our business literally has been historically commercial, the other half military. It has helped us whether the various economic cycles within DOD and the commercial markets. We sell a lot of product internationally. Our biggest market is in the America's but about 40 percent of it is international, Asia, Europe, mideast, Africa, Latin America. So I believe in competition and I believe in open trade. The difficulty that we have with competition particularly coming out of Eurocopter is the investment that the French and the European community makes in the product development. It is substantial.

The European business economic model for investment, return on investment and profit is different than what is expected here in this Nation. We find that while we can compete in the civil marketplace with—internationally, if we wanted to go in and sell to a French government agency, their equivalent to the border patrol, their equivalent to the Coast Guard, their equivalent to the local sheriff, police and fire departments, that market does not exist for us.

Does it not exist because we do not have good products? I do not believe so. I think it just does not exist for us. Yet at the same time our markets are free and open as they should be.

Mr. WELDON. You mean they will not let you compete there, the subsidies are so heavy you cannot.

Mr. MURPHEY. We could compete if the competition was an open competition for requirements but often it is not. It is decided what they are going to buy. Unlike us here in this U.S. that have open competition for—anybody can come and play, anybody can come and compete.

Mr. WELDON. I would like to have your suggestions on how we can rectify that. I do not think the French, although they are used to having double standards, it is kind of a part of their way of life.

Mr. MURPHEY. I do not know there is an immediate solution to this. What I would ask though is that with, in our government agencies, that we make sure that we have got open and fair competition. I would also ask that the Congress, NASA, the government agencies look at our investment policy as a Nation and to the rotorcraft industry and help us replicate what goes on within France and the European Union (EU) as far as support of that industry to make them worldwide competitive.

Mr. WELDON. Thank you.

On the other issue of the munitions list, I think both of you might want to comment.

Mr. KRONE. Mr. Chairman, I will speak about China and actually Mr. Borgman and I share the same issue relative to China. In Philadelphia, we had CH-47s in the production line that had actu-

ally been purchased and money had been paid by mainline China to buy a fleet of heavy lift helicopters primarily for infrastructure support and development of the interior. At the same of Tienamen Square, because the CH-47 is on the munitions list, our export license was withdrawn and we had to turn around and refund the money back to mainland China.

The CH-47 has been manufactured in several configurations. One configuration is a model 234 and Federal Aviation Administration (FAA) certified commercial helicopter. We have obtained permission to sell the commercially certified model 234 in China but believe that it is an inappropriate action for Boeing to take given that the military version is on the munitions list. I think that example highlights the dual standard that we are currently under relative to certain classifications of helicopters.

Now I do believe some of our more offensive oriented helicopters, the Apache and the Comanche, have an appropriate place on the munitions list. But heavy lift and medium lift helicopters which are in competition with helicopters like the Delfine and other products available from the French, I believe should be taken off of the munitions list and we ought to be given the opportunity to sell those competitively in the marketplace as Eurocopter has done in China. Thank you.

Mr. BORGMAN. Yes, I would like just to add to that. We have a commercial derivative of the Blackhawk which is designated the F-70. Sikorsky actually delivered 24 of those to China in the 1980s prior to Tienamen Square. Subsequent to Tienamen Square, no more could be delivered and in fact we can no longer deliver spare parts at the rate we would like to or in the areas we would like to in order for China to continue support the flight of those, although they have done an amazing job doing so. I was in Beijing last summer and they have all but one of those aircraft still flying and that is without a lot of support from us in doing so.

The result of us not being able to go there and they would very much like to buy additional F-70s from us, is that it opens up that market for the French and the French are in fact selling there. Now we do have other commercial ventures with China with things that are not on the munitions list that this particular one hurts us badly because if we could increase our production base for the F-70, it would directly result in lower prices for the military versions of the Blackhawk that do sell and you heard General Bergance talk about some of the problems that he has got with increasing costs and we could help ourselves immensely if we could increase the base, the production base for the aircraft.

Mr. WELDON. I thank you for those answers and I would just say, what you are saying is prior to Tienamen Square, you were selling these commercial variants in China.

Mr. KRONE. That is correct.

Mr. WELDON. And not because of the capability, but because of the Tienamen Square incident, you were denied that. Tienamen Square was how many years ago?

Mr. BORGMAN. That was 1989.

Mr. WELDON [continuing]. 1989. It has been 12, 13 years ago. Well that to me is outrageous and Neil if you agree me, I would like to try to ask staff to take this issue on since we are—

Mr. ABERCROMBIE. The question for us is whether or not and I am sure we will understand—we have had in this committee and Mr. Weldon has been a leader on it in trying to make sure that we do not have technology going to certain areas of the world, China included, which should be reserved to the United States, at least to the extent that obviously you cannot control the intellect, but we are talking about proven technology that could serve military purposes. But if I understood you correctly, this was not—this was a political decision which ended up with a commercial ramification as opposed to an armed services decision with respect to technology that might be utilized by a foreign military.

Mr. BORGMAN. I believe that—

Mr. ABERCROMBIE. Is that correct?

Mr. BORGMAN. Yes, I believe that to be right.

Mr. KRONE. Correct in our case as well. I just would like to call your attention that the Chinook was designed in the mid-1960s and although it is a terrific Checker cab, I do not think people describe it as high technology.

Mr. WELDON. I think as the chairman of this subcommittee, Neil, I would ask you to join with me.

Rhett, I am going to ask you to get your association behind it. We are going to make an all-out push and I will put the Pentagon on notice—no actually the State Department that this is denying U.S. workers jobs. It is denying us market share and it is allowing the French to come in and compete and sell very similar products that the China are going to have anyway. It is about time we changed it. And I think we ought to put them on notice. Rhett, you can help us with your association and without getting the companies in trouble, this can be a congressionally led action to overturn this decision and I am going to let Mr. Bolton know that we want this changed and I assume he is the right person to handle this issue for the State Department. He is a good friend of mine.

So I think it is wrong. I think it is one thing—

Mr. ABERCROMBIE. It was until now.

Mr. WELDON. And on the issue of the French in terms of, let us know what specific things we can do. I mean I am sick and tired of the French taking market share from us and we sit back and we let them do that and we do not do anything in response. Tell us what specific things besides increasing our R&D technology funding base, which you have my commitment that I am going to do this year, tell us what else. I mean I am offended by that to be honest with you. I want to do something about it.

Let me ask another question. On the issue of capabilities and I do not know whether I heard this someplace or not, but helicopters are so versatile and working issues involving disasters, as I also do in the Congress, I see helicopters in action all the time. I heard someplace where there was a possibility if we had helicopters ready to go perhaps heavy lift helicopters that we could have deployed them immediately. We have been able to even have plucked some people off of the Trade Center towers before they collapsed. Is that true? Would that have been possible?

Mr. MURPHEY. I think Flater is probably the most knowledgeable on this because we did as an industry have an after action report if you will of what happened in New York and the role of heli-



copters and Rhett chaired that as part of the American Helicopter—

Mr. WELDON. Rhett, you want to respond?

Mr. FLATER. AHS has a seminar or workshop on homeland security back in November immediately following these events and we invited down pilots from New York, especially those with the New York/New Jersey Port Authority to give us there insights about this. Subsequently there were also some articles published in the "Wall Street Journal."

The sum and substance of this is that one of the aircraft impacted the north tower. That tower really began burning. Another aircraft impacted the south tower, but within 12 minutes after the first tower being impacted, the New York City police department had a Bell 412 equipped with a hoist in the air, in the immediate vicinity of the north tower. South tower they could not do anything about. The fire was too hot. It was burning too quickly. The north tower they think they could have. Now the pilot that was flying the aircraft, the crew he had on board equipped with a hoist was the same pilot, the same crew in the same aircraft, the same Bell 412 that saved about a half dozen people from one of the towers back in 1993 after the bomb.

So they could have brought the people in and done something there. Why didn't they do it? Because there was no command in control. They were denied access to the tower by the Port Authority for the police department, by the fire department. So they could not.

Mr. WELDON. Conclusion of your study was that perhaps if we would have been able to respond immediately, we could have saved maybe a few lives.

Mr. FLATER. Correct, but there was no plan. There was no command in control and as a result they could not do anything about this. Now the other point I was going to make was pursuant to instruction from the New York City fire department, they had also locked the egress from the top floor of the towers, where the stairs come up. These rooms were locked. They could not—but they believed they could have knocked them open using equipment they had on board the aircraft. So that was what we found.

Mr. WELDON. Part of what—you all know that I am proposing is a major new initiative to really push rotorcraft forward because I am really disgusted by what NASA has done and I am not happy by what the military has done and I am concerned about the industrial base. And part of it is, I do not see the focus on rotorcraft and its capabilities that I see in fixed wing fighter tactical technology and our shipbuilding areas and yet as I heard from our military personnel, some of the largest incidents involving loss of life and casualties are in helicopters.

And if you look at the potential to perhaps enhance our travel in America, rotorcraft I think offers us some very interesting possibilities. I have seen designs for tilt rotors that I think carried as many as 80 passengers, at least conceptually I saw those designs that I think your companies have had. Yet no focus on that, yet airport expansion is a problem all over America. As I look at homeland security, I think in the case of the trade center or others, rotorcrafts can offer some tremendous potential but it seems like



nobody is putting the money on the table to look at these issues, the same we are looking at reducing the noise from aircraft engines. We spend a ton of money on that through out NASA budget, tons of money.

So let me just ask you quickly before I turn to my good friend Neil for his final questions, you have all seen the general concept of what I want to do in putting a new thrust on rotorcraft. Do you support that kind of idea and do you think it is something that is worth pursuing? Start with Rhett and go right down the line.

Mr. ABERCROMBIE. That is known as a big softball.

Mr. WELDON. Well, it could be a big pineapple if you come from Hawaii.

Mr. FLATER. I am going to respond and tell that I am fully supportive of it. I think it is a wonderful idea. I think it will provide a national focus for our industry and our research development efforts and we applaud your leadership in championing this cause. I will pass the mike down to Mr. Murphey.

Mr. MURPHEY. I would only echo what Rhett said. Rotorcraft work ever day somewhere in the world. They are taking our children and our brothers and sisters and nephew, nieces into harm's way and hopefully bringing them back again. In the U.S. domestically, they are saving lives with the EMS and the fire and rescue and preventing disasters with police and police activities. This is—these really are national assets. We need to make sure that we are not giving up our capability to continue to have this asset for our Nation.

Mr. KRONE. You know of course we enthusiastically support the concept. I think a unique aspect of the rotorcraft industry is how well we collaborate as an industry. Boeing is in the unique position to be sharing technology on two joint ventures, one with Bell and one with Sikorsky, where we literally take the best of best and share it across the industry for the benefit of the end customer. We think a national focus which has a collaborative aspect to it, will help to further the science and technology needs in the industry. Thank you.

Mr. BORGMAN. I am redundant, but I certainly support everything that has been said. We need to have a renewed emphasis on the development of rotorcraft technology. As I indicated I think rotorcraft technology is a couple of generations behind the fixed wing side. That is because there has not been the resources applied to rotorcraft as there have been in the fixed wing side. So I applaud the idea of any kind of a rotorcraft center of excellence. Thank you.

Mr. WELDON. Thank you all.

Mr. Abercrombie, the floor is yours.

Mr. ABERCROMBIE. Thank you very much, Mr. Chairman.

Thank you for being here and I want to thank supporters and interested parties in the audience for staying at this hour.

Mr. Chairman, I want to compliment you on having the hearing this time. As you know, for many of us during the day, we would not be able to—I probably would not have been able to spend this time. Of course I can spend it now because Hawaii is five hours earlier so I am still working tonight.

I am going to start off by defending the French. No, because the chairman asked for—the chairman asked for suggestions and of course, being a tool of labor, I think we should fight it in the World Trade Organization (WTO). You can talk all you want about free trade, but when it is—when you are up against subsidized essentially government commercial operations as opposed to say the DOD operation being financed by the United States government and when you are up against trade circumstances which all work for one way against our own workers here, I think that we are up against a very difficult proposition.

Now in as much as I am in the minority on that, being an economic nationalist, I am looking to say then how can we compete and my suggestion is this and I hope you will take it up. You do not have to answer tonight, but I have brought it up with the Secretary of the Air Force and with others. If you are going to do the kinds of long-term expenditures associated with the development that you have been discussing here tonight and by the way Mr. Chairman, parenthetically I want to say this is one of the best panels that I have seen. I want to compliment you and the staff on putting this together.

I would like you gentlemen and to take up the idea, at least to discuss it among yourselves about capital budgeting. Part of the reason I think you are getting stiffed on long-term investment, being able to take the long, make investment that takes long-term commitment is that we cash finance the defense of this country. You compete with the deployment that you showed us today. Those dollars now are being cannibalized out of the existing DOD budget for operations and maintenance. That is being cannibalized out of the budget and the President at some point will come to us with a supplementary request, including whatever action takes place or activities take place in Iraq or elsewhere around the world.

Philippines, we were all set to send people out to the Philippines until they discovered it was unconstitutional the other day in the Philippines. The dollars that are going to an aircraft carrier compete with what kind of research is being done with helicopters. One of the reasons you are getting stiffed on helicopters, on any kind of rotorcraft, is the money is too small. If you were asking for \$5 billion, then everybody would sit up, take notice and salute and say absolutely. Let's do it.

But part of the problem is is that the money is not big enough. I mean \$56 million, I grant you that is not much, but you see even if you said \$560 million, if we did that, that is in some respects small potatoes compared to what happens in terms of the budgeting of the Pentagon right now because once that first dollar is encumbered on an aircraft carrier. That comes off the books. That is as if the \$5 billion had already been—even though it may take five or six years to build that aircraft carrier and we have to put the money forth for accounting purposes, that money has disappeared off the table and you do not get to try and get it.

I would like to see particularly when we are doing not procurement, although I think that is a good idea too, but long-term R&D, is we have got to think seriously about having an operating budget for the DOD and a capital budget other sensible operation runs when you know that that way we could separate out the financing

of the building, the manufacture of helicopter—whether it is an advanced form of the Chinook, right that was done in 1960 and maybe this is the fourth or fifth or sixth variation which is either marginal or even exponentially improved as opposed to some of the say the 80-passenger rotorcraft that might have a commercial as well as a military application.

So you need not comment on it unless it has come up before, but I am making that suggestion. I have been working on this for several years now and it has been very frustrating because there is arguments about well, if that happens, then the appropriators will get mad at you and so on. I do not think so, because I think we are at a stage of expenditure and this maybe goes back Mr. Flater, to your—not your—your comment about the new technology.

Maybe I did not state myself clearly enough. I am not opposed to fronting new technology. Quite the opposite. What I am saying is that is the competition for dollars because of the size of the requirement, the dollar requirement for the military platforms we have today as such, that perfectly reliable technology that we now have in our military platform which most particularly manifest itself in the helicopters we have had.

I mean is there a bigger success story in the world than say the six or seven prototypes that are out there that have been improved upon over the last 50 years? My dad worked at Bell Helicopter in World War II in Buffalo back when we had manufacturing in this country instead of sending it overseas to the French. So I think that this is a big success story there. That is what I meant. That and as long as you got cash financing of the defense of this country, you are going to see that the kinds of things that you are advocating are going to have very, very tough sledding in terms of getting the financing.

So I would like you to think about that. When I said about defending the French, what I meant was, I give them credit. They know what they want. They are going after it. They are kicking in case you do not know what it is, it is just exactly what you think it is in Hawaiian. They make no bones about it. What do we got? We got jerks on television pouring wine in a sewer, changing french fry names or something like that. Come on. It is childish.

What we have to do here it seems to me is recognize that they are serious players and they are going to do that and then we have got to counteract and the way I think we counteract it is we put—I will stack up the American worker and the American manufacturer against anybody in the world if we back them up and give the opportunity. And I think capital budgeting is the way to do that.

Now this is a serious question. Again, because of this immediate reaction going on, there is going to be the air show in June and there is calls in this country right now that the United States should not participate in an air show. Now I have been privileged to accompany Chairman Young and other Members to this, both in England and in France and I am very, very impressed as a lay person in this. Someone who went and got his degree at an engineering school, Union College, they had a liberal arts tradition, because I wanted to try as someone who did not have a proclivity towards



engineering and technical nature to understand how things in society work.

I am very impressed with what happened there and I would like to have your thoughts as to whether or not the United States should participate. If we are going to compete, it seems to me to run away from being involved in—when those folks are showing off and attracting and setting up exhibits to try to sell to the world, if the United States is not there, aren't you going to be shut out?

Mr. MURPHEY. I will respond to that one. Paris is the premier air show in the world and—

Mr. ABERCROMBIE. But it is not just a show—maybe the public does not understand it. Not that it is a show. Business is done there.

Mr. MURPHEY. That is correct and it is the premier event in aviation. There are a number of U.S. companies over the years though that have elected to forego the Paris Air Show. They go to regional shows in the Latin America, Germany, elsewhere as opportunities. Some of those decisions have been economic decisions simply because—

Mr. ABERCROMBIE. Fair enough.

Mr. MURPHEY [continuing]. So expensive to participate at Paris. I think it is up to each individual company to make those kinds of decisions based upon the economics in the market should they participate or not?

Mr. ABERCROMBIE. Okay. Not everybody needs to answer, but I just think that this is something where the United States should not be running away because of journalistic vaudevillians making cheap shots on TV, all these ignoramuses that are paid, whose, the way I look at it their minds are on vacation and their mouths are working over time.

I think that the principal thing Mr. Chairman with respect to—Mr. Krone's points about the number of Chinooks that are in Great Britain for example. Is that because they buy fewer so they bought new and we have got such a big fleet or such a big investment, we just try and keep it going and we are spreading our defense dollar out a lot further than the British?

Mr. KRONE. Well, that is in fact what has happened Congressman. But I believe their acquisition strategy has been different than the U.S. Army's.

Mr. ABERCROMBIE. Okay.

Mr. KRONE. What has happened in the U.K. and I would submit that Japan also buys the Chinook and they have followed this acquisition strategy and they both have fleets of about 60 Chinooks. They have bought their Chinooks at a lower rate but over a longer period of time and inserted new technology along the way. So the U.K. started with the Mark I, the Mark II, the Mark IIA and then finally the Mark III. They have a different acquisition strategy. The way the U.S. Army bought the Chinooks was really a visage of the Vietnam era. They bought lots of helicopters very quickly in the 1960s and into the 1970s and then they had gone about the process of taking the Cs to the Ds and the Ds to the Fs, MH-47Es to the MH-47Gs in an upgrade program.

it is just a different acquisition philosophy. I will tell you sir that the Japanese do not overhaul their helicopters. They throw them



away. Is the program CH-47J program, they make a life cycle cost decision to buy new instead of overhauling the old aircraft based upon economics and math that they do relative to the JDA in Japan. So there are different ways—

Mr. ABERCROMBIE. So this is a strategy.

Mr. KRONE. Yes, there are different ways to look at maintaining your helicopter base and we have seen each country I think take a different strategy in that regard.

Mr. ABERCROMBIE. And then, Mr. Borgman, you talked about the absence of the investment dollars and that goes to capital budget. So my guess, my final question again, I am very grateful for you staying so late, but believe me, I know Curt Weldon and he is going to carry through on these things. So your time is not ill spent at all, I can assure you of that.

Would you be interested—do you think there is some merit in at least exploring the idea of trying to get a capital budget into the DOD? Does it strike you at all, other than Mr. Murphey I think seemed a little bit favorable, at least to the idea, does it strike you as strange and unworkable and just is not and why waste time?

Mr. BORGMAN. No, I would not, I would not discount that at all. I think it is something that should be explored and in fact any mechanism that would allow us to invest in this industry is something that we ought to explore and I think that is something that ought to be on the table.

Mr. ABERCROMBIE. I do not—I just do not see—well, I am interrupting unless there is no other comment.

Okay, well Mr. Chairman, you have indulged me enough.

Mr. WELDON. Will the gentleman yield on that?

Mr. ABERCROMBIE. Certainly.

Mr. WELDON. Rhett, can I ask you to go to the industry groups and you all belong to the aerospace industries association. Why do not we ask them to take Neil's idea, because he has talked about this since I have been hearing, why do not we ask them to come back and see if—wouldn't that be the appropriate group to do it?

Mr. FLATER. We would be delighted.

Mr. WELDON. Ask them to come back to us because we are the procurement committee if there is some suggestions about Neil's idea that might work that we could act on this year.

Mr. ABERCROMBIE. You see the way the committee has been re—it is interesting. It is interesting to me because I am sitting here. I am going to stay longer and the rest of you are wondering when the hell we are going to stop, but some good things can come out of this. See, the way Mr. Hunter has reorganized the committee is to try and modernize our capacity to respond. In other words, we are now organized vertically instead of horizontally so that we can do R&D procurement, authorization and move to appropriation in a way that makes sense in terms of the mission requirements of the various services and their satellites.

And so for the first time I feel a little bit optimistic that maybe something like capital budgeting in the DOD can work because you can set off segments of the whole process which—in which you now you are going to have to make an investment for maybe eight, 10 or 12 years. So who knows, in order to accomplish this. So that you do not have to come in with the equivalent of—like you do in your

own companies, how are we going to do this quarter and if we are not making money, we are screwing the guy that is off standing there saying, you know, this is going to take three or four years for us to get a return, is the guy that is made to stand in the corner in the back of the room and if there is anything left over, he or she gets it at that point. So that is—yes.

Mr. KRONE. I would only liken Congressman, your thoughts to the role of multi-year contracting in procurement and significant benefits that that has accrued the government on programs like the C-17 and the F-18. Your suggestion takes that even further and says we ought to look in capital budgeting starting at the S&T phase of the programming and carry that all the way through production.

Mr. ABERCROMBIE. Right, so that it does not compete then with deployments and operations and training and maintenance and all of the other aspects which otherwise will fall down. And the last thing I want to say Mr. Chairman is this. The Army is always going to be bringing up the rear on this because it does not cost enough. There are very few carrier equivalents in the Army. There are very few Air Force joint strike fighters. The helicopters have a tough time competing against the Joint Strike Fighter (JSF) just for your own company, say Boeing. You are looking at one thing.

You are several hundred million, billion dollars maybe you are looking at and over here is the helicopters on the side saying gee can we have some more gruel too, and we are the Oliver Twist syndrome there. He is a cute kid, but he did not get the gruel. And so this is a way I see for getting some equity into this process and for seeing to it that the kind of capital investment we are going to need to make anyway in the end gets funded in a manner that does not then compete with the operations side. Thank you. I will send some of this stuff along to you folks and if you could just—if we get the idea just out there and with the good offices of the chairman maybe we can explore this to see whether it is worth bringing to fruition.

Thank you, Mr. Chairman.

I want to thank everybody for indulging us up here. I tell you for a fact that with Curt in charge, everybody's testimony tonight is going to be digested and we will come up with something. We were not just here marking time.

Mr. WELDON. I thank the gentlemen and he is correct. We will take these items. We will go to work on them and we will guarantee we will give you results this year. We ask for your support. I just want to say one thing before you all leave. It is 8:30 at night. We have been sitting here for 3 1/2 hours. Usually you will never have 70 people sitting in a congressional hearing room unless there is some scandal involving a Member of Congress. Everyone wants to hear the last little tidbit and for 70 people to sit here, obviously somebody did their homework.

So Rhett or all of you, what your team—I assume these are probably all subs. How many are subcontractors on the rotorcraft programs? Well, for all of you who are here, thanks for sticking around. I mean, for 3 1/2 hours. You deserve a Hawaii for sitting listening to Neil and I speak.

Mr. FLATER. Mr. Chairman, if I could just say one word in closing and that is that I wanted to endorse Mr. Abercrombie's proposal and I want to assure the chairman and Mr. Abercrombie we will take this issue up in the supplier base that is arrayed behind me and with the primes located beside me, but the cost of what we are looking for really, the amount that we are looking to capital budget is less than the cost of a single F-22. We are not talking about a lot of money. Thank you.

Mr. ABERCROMBIE. I did not mean to imply that you are not—we are not going to take this up unless this kind of thing happens. I am just saying that I think capital budgeting is an idea in the overall context of DOD research and long-term development of crucial platforms is something that I think——

Mr. WELDON [continuing]. Supporting your idea so he deserves a box of Macademia nuts or a pineapple.

With that, this hearing stands adjourned. Thank you all.

[Whereupon, at 8:29 p.m., the subcommittee was adjourned.]





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# A P P E N D I X

MARCH 12, 2003

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**PREPARED STATEMENTS SUBMITTED FOR THE RECORD**

MARCH 12, 2003

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**Statement of the Honorable Curt Weldon  
Chairman, Subcommittee on Tactical Air and Land  
Forces**

**Rotorcraft Industrial and Technology Base Hearing**

**March 12, 2003**

This afternoon the Tactical Air and Land Forces Subcommittee meets to receive testimony from both government and industry witnesses on the breadth of the Department of Defense's current rotorcraft programs and the industrial base that supports those platforms, as well as the technologies for future rotorcraft requirements.

Currently, there are 11 different major rotorcraft programs within DOD. All are manufactured by one of the three major helicopter manufacturers represented here today: Bell-Textron, Boeing, and Sikorsky. While there are 11 different types of rotorcraft programs, most of these aircraft were fielded beginning in the early 1970s and continuing through the 1990s.

In the fiscal year 2004 budget request, funds are requested for only two major platforms – two variants of the Sikorsky H-60 for

both the Army and Navy, and two variants of the Bell-Boeing V-22 Titlrotor aircraft for the Marine Corps and the Air Force. The remainder of procurement funds requested are for six major upgrade programs to existing helicopters, which include the:

- a) Apache Longbow heavy attack helicopter,
- b) Army and U.S. Special Operations Command Chinook heavy lift helicopter,
- c) Army Blackhawk utility aircraft
- d) Marine Corps Huey utility aircraft, and
- e) Marine Corps Sea Cobra attack helicopter.

I am concerned that most of these aircraft have already reached at least their first 20 year life span, with the average age at of Chinook variants to be upgraded to the more capable "F" models being over 12 ears old. What is deceiving about the age of the "D" variants is that they are already in their second remanufacture. Similarly, the average age of the Marine Corps Huey, which will be upgraded to the "Yankee" model, is already 28 plus years old. I'm somewhat less concerned about the average age of the current Marine Corps Sea Cobra fleet, which is over 13 years old. Fortunately, it appears that we will begin this upgrade in



FY 04 to achieve economies of scale while upgrading the UH-1N variant.

As far as future platforms, there are only two rotorcraft programs currently in development. The Army has requested \$1.1 billion in FY 04 for continued development of its Comanche reconnaissance attack helicopter. The Comanche is designed to replace the Kiowa Warrior, which is forecast to remain in the inventory for the next 20 years while the Comanche continues in development and is fielded. It appears that the Comanche program is finally funded adequately in this request and we'll be watching this program's progress throughout this fiscal year since this is such a pivotal year for the program.

The Department of the Navy has requested \$197.4 million in the FY 04 request for the replacement of the VH-3 presidential support helicopters, which are over 27 years old.

The point is the Department of Defense's rotorcraft fleet is getting pretty "long in the tooth," and the lifespan of the current fleet will be used up much faster over the next several years now that we are operating our forces at a much higher tempo in the War on Terrorism and especially if we go to war with Iraq.

I am concerned that the adequate amount of resources for rotorcraft are not being applied by DOD, since most new aircraft are being produced at a minimum sustaining rate and the aircraft that are being upgraded could be modified and fielded at a much higher economic rate.

Similarly, I would hope that DOD would not allow the presidential replacement helicopter program to become a prolonged development initiative like the Comanche has been. This does not serve our forces well, who should have the best technology in the world, nor the U.S. companies that are struggling to maintain some production and research and development capability to continue to fulfill future defense requirements and try to remain competitive in international markets.

Also, of interest to the Subcommittee today are the future technologies and initiatives that are underway to produce advanced, future rotorcraft for the military. From my experience as the chairman of this committee's former Military Research and Development Subcommittee, I believe that we need to spend more on rotorcraft technologies and related research and development efforts. This is the "seed corn" that will keep the U.S. rotorcraft

industrial base viable to fulfill future defense requirements and remain internationally competitive.

Today, we have both a government panel of witnesses representing the Army and the Department of the Navy, as well as an industry panel comprised of the CEO's of the three major U.S. rotorcraft manufacturers.

Our DOD panel is comprised of:

- 1) Major General Joseph L. Bergantz,  
Program Executive Officer for Army Aviation;
  - 2) Dr. Thomas H. Killion  
Director for Technology under the Deputy Assistant of  
Secretary of the Army for Research and Technology;
  - 3) Rear Admiral Thomas J. Kilcline, Jr.,  
Head, Aviation Plans and Requirements Branch,  
Navy Air Warfare Directorate;
- (pronounced "LOX")
- 4) Mr. Thomas Laux  
Acting Program Executive Officer,  
Air Assault and Special Mission Programs;
- and,

Our industry panel is comprised of:

- 1) Mr. M.E. Rhett Flater  
Executive Director  
American Helicopter Society International;
- 2) Mr. John R. Murphey  
Chairman and Chief Executive Officer,  
Bell Helicopter Textron;
- 3) Mr. Roger A. Krone  
Senior Vice President, Army Systems,  
The Boeing Company;

and

- 4) Mr. Dean C. Borgman  
President,  
Sikorsky Aircraft Corporation

I would like to proceed today with the first panel's testimony and then go into questions for that panel, and then immediately take the second panel's testimony, which will then be followed by questions.

Before I turn it over to my good friend from Hawaii, I would like to extend my condolences to the families of the soldiers that were lost in the Army Blackhawk that crashed yesterday at Fort



Drum, N.Y. and our hopes for a full recovery to the two survivors of the crash.

I would now like to recognize the gentleman from Hawaii and my good friend, Neil Abercrombie, for any remarks he would like to add.

(Back from Abercrombie)

Before we begin, without objection, all witnesses' written testimony will be accepted for the record.

General Bergantz, the floor is yours.

**STATEMENT BY**

**MG JOSEPH L. BERGANTZ  
PROGRAM EXECUTIVE OFFICER  
AVIATION**

**BEFORE THE**

**COMMITTEE ON ARMED SERVICES  
UNITED STATES HOUSE OF REPRESENTATIVES**

**ON ARMY ROTORCRAFT PROGRAMS AND FUTURE TECHNOLOGY  
INITIATIVES**

**FIRST SESSION, 108<sup>TH</sup> CONGRESS**

**MARCH 12, 2003**

**STATEMENT BY  
MG JOSEPH L. BERGANTZ**

Mr. Chairman and distinguished members of the Committee, thank you for this opportunity to report to you today on the Posture of Army Aviation Rotorcraft programs.

With me today are Dr. Thomas Killion, Director for Technology in the Office of the Assistant Secretary of the Army (Acquisition, Logistics and Technology), and Colonel John Bendyk, Chief, Aviation Division in the Office of the Deputy Chief of Staff, G-8.

Army aviation is a key combat enabler capable of shaping the battlefield, developing situational awareness, providing long range fires, shielding the maneuver force, close support, and extending the tactical and operational reach of commanders for the Interim and Objective Forces as well as Home Land Defense. Aviation is critical to the Army's stability and support requirements. Aviation brings these and other capabilities to the battlefield: RAH-66 (Comanche), AH-64 (Apache), UH-60 (Black Hawk), CH-47 (Chinook), OH-58D (Kiowa Warrior), and the Tactical Unmanned Aerial Vehicles. Aviation includes extensive recapitalization of the Apache, Black Hawk, and Chinook programs, Joint/combined force digitization and connectivity, and upgraded Aircraft Survivability Equipment (ASE). Our program also includes Hellfire missile modernization and development of a lighter weight version plus an Advanced Precision Kill Weapon System to augment Hellfire, and development of the technologies for and the ability to team with Unmanned Aerial Vehicle interoperability with next generation/future system development.

The acquisition process must begin with a solid statement of requirements. The key body associated with determining those requirements is the Joint Requirements Oversight Council (JROC). The JROC is an advisory council to the Chairman of the Joint Chiefs of Staff (CJCS). In this capacity, the JROC reviews all warfighting deficiencies that may necessitate major defense acquisition programs and validates that such deficiencies cannot be satisfied by

non-materiel means, e.g., changes in doctrine, tactics, training, or organization. Additionally, the JROC assists the CJCS in identifying and assessing the priority of joint military requirements, among existing and future major acquisition programs, to meet the National Military Strategy (NMS). The JROC ensures that the assignment of such priorities conforms to and reflects resource levels as projected by the Secretary of Defense through the Defense Planning Guidance. At the CJCS's direction, the JROC also evaluates alternatives to satisfying warfighting requirements by comparing the cost, schedule, and performance criteria of selected programs and identified alternatives.

To accomplish these tasks, the JROC oversees a Joint Capabilities Integration and Determination System (formerly Requirements Generation System) which standardizes the analysis required for mission-need determination, validation, and approval prior to start of the acquisition process. The JROC ensures that emerging performance objectives and thresholds adequately address the warfighting mission need and that the delivered capability and timing of that delivery are linked to the NMS.

JROC actions on aviation programs in the last 5 years include: on October 3, 2002, Comanche JROC Operational Requirements Document (ORD) approval supporting a Restructured Program Milestone II; on March 5, 2001, UH-60M model Black Hawk JROC ORD approval supporting Milestone B decision; on March 27, 2000, Comanche JROC ORD approval for supporting Milestone II decision; and on April 13, 1998, Chinook JROC Key Performance Parameters approval.

Next, I'll address our key Army aviation programs.

The Comanche, a multi-role helicopter for the Objective Force, will be capable of executing a range of missions in support of close combat, vertical maneuver, and mobile strike operations. Recently, on October 7, 2002, the Defense Acquisition Board approved a restructured Comanche program. The acquisition strategy includes Engineering and Manufacturing Development through Block III, a Low Rate Initial Production (LRIP) of 73 aircraft, and a procurement quantity of 650 with a maximum production rate of 60 helicopters



per year. We look forward to a LRIP decision in Fiscal Year (FY) 2007, with deliveries beginning in late FY 2008.

The Comanche's basic unit is a 12-ship organization that will team with Unmanned Aerial Vehicles to enable the commander to see first, understand first, and act decisively by employing joint and coalition munitions for precision effects. Comanche is capable of employing the current and future family of rockets and missiles, but its ability to collect and share data through a "common operational picture" sets it apart from current helicopters. Comanche will have the data links, on-board computer processors, sensor payloads, and weapons suite essential to prosecuting the joint warfight. Comanche's stealth, agility, and joint interoperability make it equally capable from peacekeeping and small-scale contingencies to major engagements.

The Apache is a heavy attack helicopter, interoperable with the Objective Force. Organized into battalions or squadrons of from 18 to 21 aircraft, attack helicopters have the mission to find and destroy enemy forces, day or night, in less than optimal weather, in support of the Joint Force Commander. Apache's primary weapon system is the Hellfire missile, with a range of 8 kilometers (5 miles). The Apache is fully interoperable with joint tactical level communications architectures, and is capable of operating with any Joint Force. The current Apache program is funded through FY 2006, completing 501 Longbow production aircraft. The 284 Block I (Lot 1 - 5 of Multi-Year (MY) I & lot 6 of MY II) aircraft just completing production provides our current force with a significant advancement in technology over the legacy Apaches (AH-64A model). The Block II (Lot 7 to 10 of MY II), currently in production through FY 2006, will deliver 217 units capable of supporting Interim Forces with digital connectivity and full digital situational awareness using the Tactical Internet. Apache usage rates averaged 175 flight hours per aircraft in FY 2002. The average Class A accident rate (Class A is defined as involving costs of \$1 million or more and/or destruction of an Army aircraft) was 6.99 per 100,000 flight hours in FY 2002. Since 1985, a total of 45 Apaches have been lost to accidents.

The Black Hawk, also interoperable with the Objective Force, is the Army's utility helicopter. The Black Hawk is used in multiple roles in support of the Joint Force Commander. Its primary mission, air assault, transports infantry soldiers and light artillery directly into battle positions. In its general support role, the Black Hawk is used to move personnel and cargo across all echelons of the battlefield, from the front lines to the rear areas. Approximately 24 percent of the Army's Black Hawk fleet performs the Aeromedical Evacuation mission. The Black Hawk will also serve as the host aircraft for the new Army Airborne Command and Control System. In Special Operations, the MH-60 model platform is used as both an assault and armed defensive aircraft. The Black Hawk is interoperable with Joint Forces and variations are in use in the Navy and Air Force. The Black Hawk aircraft is currently in its 26th year of production with Sikorsky Aircraft Corporation. The current UH-60L model FY 2002 to FY 2006 multi-year contract was based on a firm commitment by the Army to buy 80 aircraft and by the Navy to buy 82 aircraft over the next 5 years (roughly 32 aircraft per year). UH-60M model new production quantities for the years FY 2008 to FY 2011 average 5 new production aircraft per year (supplemented with an average of 60 remanufactured aircraft per those years). The primary source of UH-60M models to the Objective Force is the remanufacturing line. Low production and remanufacturing rates may lead to stagnation of business, design, and manufacturing capabilities. The Black Hawk new production line is scheduled to end in FY 2011. The UH-60L and UH-60M models have a maximum gross weight of 22,000 pounds. The Black Hawk can carry an internal load of 11 combat equipped soldiers. The UH-60L model carries an external load of 5,200 pounds consisting of carrying vehicles, ammunition, and supplies. The UH-60M model carries 5,300 pounds. Black Hawk averaged 174 flying hours per aircraft in FY 2002 for both the Active and Reserve Components. Class A accident rates for FY 2002 were 1.63 per 100,000 flying hours. Since 1988, a total of 73 Black Hawks have been lost to accidents.

The Chinook is a twin engine, tandem rotor, cargo helicopter with three external cargo hooks rated for a maximum hook load of 26,000 pounds. It is the Army's only helicopter capable of moving external payloads of more than 9,000 pounds. The Chinook also has an internal capacity of 33 troops. The Chinook is a theater and corps asset with two companies of 14 each at theater and four companies of 14 each per corps. A total of 173 of the Army's 429 CH-47s were originally manufactured prior to 1966 as -A, -B, or -C models. Those same aircraft will begin remanufacturing into CH-47F/MH-47G models, with the first entering the production line this year. The CH-47F model, with its upgraded cockpit, will be interoperable with joint tactical level communications architectures and capable of operating with any Joint Force.

The MH-47 model is the Army's Special Operations variant of the Chinook. The MH-47 model is modified with an aerial refueling probe, larger internal fuel system, an advanced glass cockpit, and multi-mode radar. Current technology will allow the CH-47F model to be a viable part of the Objective Force modernization effort and will allow interoperability with the Future Combat Systems (FCS). The CH-47F model remanufacturing line is currently operational and block upgrade strategies will allow the CH-47F model to stay interoperable for the immediate future. The Cargo Helicopter Project Office is developing growth strategies to allow the Chinook to partially meet these emerging requirements. A new aircraft will be required to meet the full requirement to provide a vertical maneuver capability to the FCS equipped Objective Force. Current studies show that the AMT equipped aviation force will still need a Chinook-like capability well into the future. The AMT concept is currently not funded. Critical technologies to allow the Chinook to grow include: integrated high-performance turbine engine technology, unmanned vehicle technology, advanced high-speed rotorcraft research, alternative fuels, advanced rotors and drive systems, lightweight structures, signature management, active and passive protection systems, electronic counter-measures, artificial intelligence, decision aids, improved modeling and simulation, and mission planning and rehearsal capabilities. Usage Rates averaged 139 flying hours per aircraft for FY 2002.

Class A accident rates for FY 2002 were 6.78 per 100,000 hours. There have been a total of 19 CH-47D/MH-47D/E A/C model losses since 1985. Both the Class A accident rate and the total aircraft losses include recent combat activity.

The Kiowa Warrior is a light attack and reconnaissance helicopter. The aircraft is organized into attack battalions in Light Infantry and Airborne Division and Cavalry Squadrons in all divisions. The Kiowa Warrior attack battalion helicopters have the mission to find and destroy enemy forces, day or night, in support of the Joint Force Commander. The Cavalry Squadrons provide aerial reconnaissance throughout the Joint Force Commander's area of operations. The Kiowa Warrior can carry the Hellfire laser guided missile, 2.75" rockets, and the .50 caliber machine gun. The Kiowa Warrior continues to conduct armed reconnaissance/security, target acquisition/designation, command and control, light attack, and air combat (defensive) missions in support of combat and contingency operations. Out of production, the normal peacetime OPTEMPO for the Kiowa Warrior is 240 hours per aircraft per year. The accident rate in FY 2002 was 5.46 Class A mishaps per 100,000 flight hours. To date, a total of 36 have been lost to accidents. Kiowa Warriors will begin moving out of the force in 2009 as Comanches replace them.

The TH-67 (Creek) is the Army's initial entry training helicopter for Flight School XXI. The current requirement is 185 aircraft. The TH-67 comes in three variants: TH-67 VFR variant, TH-67 IFR variant, and the TH-67A+. All initial entry rotary wing pilots will train in these aircraft through the instrument phase of training prior to training in their advanced aircraft (Apache, Black Hawk, Chinook, or Kiowa Warrior).

The Army's Unmanned Aerial Vehicles (UAV) are an emerging capability with the potential for immense operational impacts. The Army's use and development of Unmanned Aerial Vehicle Systems (UAVS) centers on the abilities of soldiers and commanders to use these systems in flexible and adaptive tactical operations from the platoon through corps echelons.

September 2002 saw a Department of Defense (DoD) milestone when the Tactical Unmanned Aerial Vehicle (TUAV) (Shadow) system was approved by



the Army Acquisition Executive and the Army Systems Acquisition Review Council for full rate production. The Shadow is a brigade-level asset that provides the brigade commander with the ability to shape and fight the battle. Shadow systems are currently fielded at Fort Huachuca, Arizona; Fort Hood, Texas; and, Fort Lewis, Washington. Shadow fielding is planned through 2009. The Army's Hunter UAV is our most extensively used system with over 24,000 flight hours and 7,000 separate flights. The Hunter is deployed to corps units requiring long range and long endurance. Currently, Hunter UAV companies are assigned to Fort Hood, Texas; Fort Polk, Louisiana; and, in Summer 2003, will be fielded to US Army Europe (USAREUR). The Hunter program will extend through 2009.

The Army has initiated two new UAV programs – the Extended Range and Multi-Purpose (ER/MP) UAV program and the interim Small UAV program. The ER/MP is designated to be employed at the division or corps-level with fixed wing, long-range capability for Reconnaissance, Surveillance and Target Acquisition, communications relay, and weaponization. The ER/MP First Unit Equipped could be as early as FY 2006. The interim Small UAV is designated to be employed at the squad and platoon-level for the dismounted soldier. The Army has notified Congress of a FY 2003 new start program for the interim Small UAVs.

The Army is scheduled to field the first FCS equipped battalion in FY 2008 for the Unit of Action (UA), brigade sized organization. FCS contains four classes of UAVs from the platoon through brigade-level. The UAVs in FCS are fundamental to the success of the FCS program and the UA concept.

Please allow me to address some of the critical issues affecting us in Army aviation today.

First is obsolescence. As a consequence of moving away from the use of military specifications and standards to a greater reliance on commercial items, the rapid and constant change in commercial technology has accelerated obsolescence problems in aviation systems when viewed from the life cycle of a major weapon system. Development efforts must anticipate and include

provisions for planned technology upgrades, therein requiring a continual infusion of research and development funding into fielded systems. Production planning must include some degree of life buys and obsolete component replacements. We are currently receiving Congressional support to reprogram \$5 million from research and development funds to procurement funds for the one time buyout of Pentium processors for the Comanche program. Operation and Support planning must include investments for planned replacement/upgrade to restore or improve reliability lost through obsolescence.

Another issue involves Contractor Rate increases. Rates have been impacted by the merger of corporations as reflected by changes in company processes such as accounting practices, changes to standard operating procedures, and the application of new management policies. In addition, corporate organizational changes and economic impacts, business base impacts as older programs draw to a close, or as mergers include potential reductions in overall facility requirements have resulted in less capital expenditures in contractor facility upgrades to offset the rising costs of operations. The application of additional corporate overhead costs primarily derived from issues in the commercial product lines being shared across defense products are impacting rate structures. The result is that our aviation programs are being faced with rising costs unrelated to performance.

Another issue involves contractor competition. Business for primes has been dwindling as we bought fewer new airframes over the past five years and instead focused on the modifications. Modifying existing airframes usually involves a sole source negotiation with the original equipment manufacturer. Our options are limited because we cannot afford to miss out on important advancements or risk losing industrial suppliers critical to sustainment of our fielded systems. The result is that aviation programs are being faced with increased costs and limited competition.

Also, we are seeing other effects in the aviation industrial base as a result of mergers and acquisitions. DoD faces the potential loss of major subcontractors that, through multiple acquisitions, have moved into the

commercial market with the defense customer no longer their primary source of business. LHTECH, the Comanche engine manufacturer, is a good example. Two years ago when the commercial market for the T-800 engine did not materialize as planned, corporate discussions were held to determine whether it was profitable for LHTECH to continue with the engine program if defense was going to be the primary customer. Only through several high level Department of Army leadership assurances that there would be continued support for the program and the corporation's specific commitment to Comanche, was the threat abated. We remain concerned about potential losses in our major subcontractor community and the resultant effects on increasingly complex aviation systems.

Another concern arises from the effects of reduced production rates on the ability of our manufacturers to maintain a fully staffed and trained work force. At lower volumes of production/remanufacturing, the manufacturer cannot effectively maintain a large work force. This usually results in many older workers retiring as production staff decreases. With this, we lose their skills and the available work force is challenged in its ability to meet priority surge production. This situation, combined with the lack of investment in tooling or production line improvements, while requiring the contractor to accommodate a surge requirement with a diminished base of production will be extremely difficult, if not impossible, to pursue.

Currently, reduced readiness rates are primarily due to unavailability of spares and repair parts. Funding constraints in the recent past have caused a depletion of critical spares (i.e., dynamic components). This trend has resulted in our contracting for spares at rates much less than our requirements. Consequently, many commercial vendors are much less motivated to stay in the defense spare parts business. These lower quantities drive increased unit cost and have a longer-term effect of reducing the competitive base.

At this point, I'll change direction, and briefly address the Army's Transformation to the Objective Force. This Transformation presents an opportunity for aviation acquisition programs to align themselves with the maturation of FCS through smaller, focused block upgrades. This approach will

ensure our major aviation systems (both manned and unmanned) remain technologically and operationally relevant well into the future and is consistent with other major DoD acquisition programs. Similarly, the Army's Unit Set Fielding approach for UA and Units of Employment (UE) provide aviation Program/Project/Product Managers and Weapon System Managers with the ability to reorganize existing aviation units into Objective Force squadrons and battalions that enjoy consistencies and commonalities in Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) architecture, sensor packages, and ground support equipment. In doing so, UA or UE gain synergies from digital connectivity and interdependence of this system of systems environment. A key part of this interoperability relies on continued development of the Joint Tactical Radio System (JTRS). In that regard, we plan on equipping Army aviation systems that will remain in the Objective Force with JTRS ahead of the FCS. Combined with enhancements of the Improved Data Modem, Army aviation platforms will attain an unprecedented degree of interoperability with Army and joint air and ground systems.

Key force structure decisions that have not yet been made (for UE and Reserve Component) will influence both procurement objectives for new systems (Comanche and Objective Force compliant models of the Longbow, Black Hawk, and Chinook) and recapitalization efforts of our current fleet of aircraft. Focused recapitalization initiatives currently in place must continue in order to maintain safe operations and acceptable levels of reliability. Other modernization efforts that are designed to improve the overall quality of our aviation fleets – apart from those required in the Objective Force – compete with other Army requirements and priorities. Posturing aviation acquisition programs to support Army Transformation to the Objective Force – with parts of this not completely defined and while sustaining our current capabilities (and maintaining our current combat overmatch) – represents a considerable challenge. Current events in Iraq and Korea place a greater financial burden on all the Services and will undoubtedly impact future acquisitions. While these events are unfolding, we are developing a strategy that is affordable and prudent.



The Army aviation Science and Technology (S&T) program produces new knowledge to fuel revolutionary aviation development, expands scientific knowledge in the area of manned and unmanned helicopters, and matures and demonstrates manned and unmanned helicopter technologies in support of the Objective Force and Joint Vision 2020. Based on the Army Transformation, this effort has been focused to investigate and mature technologies applicable to unmanned systems and to support selected opportunities for manned systems. The Vertical Takeoff and Landing (VTOL) UAV potentially brings unprecedented agility, maneuverability, and lethality to the Objective Force, while increasing survivability. The transformational nature of the UAV has energized the aviation field in industry and academia to seek application of truly innovative technologies. The benefit to DoD and the Army will be revolutionary warfighting capabilities, as well as enhancements to the current force.

The Army has a unique responsibility within DoD as the Service lead for rotorcraft S&T investment. Under DoD Project Reliance, the Army has the responsibility to address the rotorcraft S&T requirements of all services and the Special Operations Command in those areas that are not service or command unique.

The aviation S&T program investment is in the three areas of basic research, applied research, and advanced technology development. In the area of basic research, the Army invests in world-class expertise in academia, industry, and other government agencies, as well as in state-of-the-art equipment. A highlight of basic research is the investment in the Rotorcraft Centers of Excellence at Pennsylvania State University, the Georgia Institute of Technology, and the University of Maryland. Basic research is conducted by the Aviation and Missile Research, Development and Engineering Command's (AMRDEC) Aeroflightdynamics Directorate located at the Ames Research Center, Moffett Field, California, and by the Army Research Laboratory (ARL) Vehicle Technology Directorate at the Glenn Research Center, Cleveland, Ohio, and the Langley Research Center, Langley Air Force Base, Virginia.

The Army aviation applied research program provides the enabling technology and baseline for aviation development. The research includes enabling technologies for manned and unmanned rotorcraft in propulsion, rotors, drive train, and structures. A highlight of the program is the expansion of knowledge in air system autonomy and manned-unmanned teaming. The applied research program also invests in the National Rotorcraft Technology Center, a partnership of government, industry, and academia to develop air vehicle designs and other rotorcraft technologies. The program is executed at the Ames Research Center, the Langley Research Center, and the ARL Vehicle Technology Directorate at the Glenn Research Center.

A key element of the aviation applied research program is the longstanding partnership between the Army and the National Aeronautics and Space Administration (NASA). This partnership, first established in 1965, has resulted in an exemplary, highly integrated national technology program that is fully coordinated with industry and devoid of duplication of facilities and programs. The Army and DoD have leveraged NASA intellectual capital in rotorcraft and world-class facilities; all of the United States fielded military rotorcraft, and derivations that have established our commercial base, can be traced back to this Army/NASA partnership. The DoD/Army rotorcraft and VTOL UAV technology development strategies depend on the continuing partnership with robust, closely related NASA technology programs.

The aviation advanced technology development program is focused on UAVs, with an emphasis on demonstrations to provide the warfighter with the menu of technology for development and integration into the force. The demonstration programs will mature technology into realistic and robust prototypes. Technologies that enable autonomous flight, higher aerodynamic airframe loads, and increased maneuverability with UAVs will be demonstrated. The program also invests in propulsion, drive train, and structure technologies that enable UAV application and have technology transfer opportunities to manned airframes.

The highlights of the advanced technology development program are the major demonstrations for manned-unmanned teaming, and the Army-Defense Advanced Research Projects Agency (DARPA) partnering on UAV platforms for lethality, surveillance, and communications relay. The Airborne Manned-Unmanned System Technology and the Hunter-Standoff Killer Team Advanced Concept Technology Demonstration constitute the major efforts to demonstrate manned-unmanned teaming. The Army is pursuing increased lethality for the Objective Force through the Unmanned Combat Armed Rotorcraft (UCAR) program, an armed VTOL UAV, designed to team with manned or unmanned systems. Increased surveillance capability is being pursued through the A-160 Hummingbird program, a medium altitude, long endurance VTOL sensor and communications platform, and the Organic Air Vehicle (OAV), a ducted fan VTOL UAV that can be carried by the soldier and/or launched from a vehicle. The UCAR, A-160 and OAV are joint Army-DARPA projects. The advanced technology development program is managed by the AMRDEC Aviation Applied Technology Directorate at Fort Eustis, Virginia.

The investment by the Army in aviation S&T is guided by the requirements of the Objective Force, and investment in advanced technology development is growing in the coming years to meet the challenges of those requirements. The Army is confident that the aviation S&T investment represents a prudent program that meets DoD and Army Transformation goals.

In summary, Army aviation is well positioned to respond to today's challenges on and off the battlefield, and is ready to assume its key role in the Army's Objective Force.

NOT FOR PUBLICATION UNTIL RELEASED  
BY THE COMMITTEE ON ARMED SERVICES  
HOUSE OF REPRESENTATIVES

STATEMENT OF

REAR ADMIRAL THOMAS J. KILCLINE, JR., UNITED STATES NAVY  
HEAD, AVIATION PLANS AND REQUIREMENTS BRANCH OF THE NAVY AIR  
WARFARE DIRECTORATE

BEFORE THE

SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

OF THE

HOUSE ARMED SERVICES COMMITTEE

ON THE

DEPARTMENT OF THE NAVY ROTORCRAFT PROGRAMS AND FUTURE TECHNOLOGY  
INITIATIVES AND CONCERNS

MARCH 12, 2003



NOT FOR PUBLICATION UNTIL RELEASED  
BY THE COMMITTEE ON ARMED SERVICES  
HOUSE OF REPRESENTATIVES

Mr. Chairman and distinguished members of the Subcommittee on Tactical Air and Land Forces, I am Rear Admiral Thomas J. Kilcline, Head, Aviation Plans and Requirements Branch in the Directorate of Air Warfare. In representing our Navy Marine Corps team, I am today joined by Mr. Thomas Laux, Acting Program Executive Officer (Air Anti-Submarine Warfare, Assault, and Special Mission Programs), Colonel Raymond E. Schwartz, Head, Aviation Weapons Systems Requirements Branch, HQMC, and Captain Wayne Tunick, Head, Helicopter Requirements, Directorate of Air Warfare, USN. We are pleased to appear before you to provide an update on the Department of the Navy rotorcraft programs and future technology initiatives and concerns. I, and my Navy and Marine Corps colleagues in the rotorcraft community, sincerely appreciate your interest in our rotorcraft program capabilities and initiatives.

As you are keenly aware, rotorcraft are essential to Navy/Marine Corps deployed forces. In support of joint and coalition operations, maritime forces will provide Sea Strike, Sea Shield capabilities of unprecedented range and accuracy, global connectivity of great capacity and survivability, and

streamlined logistics to support joint forces throughout the battle space. To meet the Sea Shield requirements, dominance in the missions of Anti Submarine Warfare, Anti Surface Warfare, Mine Interdiction Warfare, and Naval Special Warfare will be essential.

Future air combat trends are changing, as evidenced by the Fiscal Year 2003 Pilot Training Pipeline - 42 percent of new Navy pilots are designated rotary wing pilots. With more rotorcraft in the Naval battle group than ever before, mission tasking is on the increase, and transformation of the rotorcraft Concept of Operations is key to future operations.

With Chief of Naval Operations approval of the Naval Helicopter Concept of Operations in January 2002, the rotary wing transformational initiative took a major step forward. Simultaneously, the Marine Aviation Campaign Plan established a vision for Marine Corps rotorcraft operations in the future. Because of the diverse applications and distinctly different battle group missions, the Navy and Marine Corps offer unique solutions to meet specific needs. However, rotorcraft are the common thread required to realize the offensive capabilities of the Carrier Strike Group, Expeditionary Strike Group, and Surface Action Group.

As these rotorcraft Concepts of Operations mature, our challenge is to provide the highest value and responsiveness in

answering Warfighter requirements for effective, reliable, interoperable, and affordable weapons systems. The Navy Helicopter Concept of Operations and the Marine Aviation Campaign Plan are the linchpins of a modern, total force solution to increase Fleet capability and lethality in the littorals.

The Navy Helicopter Concept of Operations outlines the neck-down of the Navy's battle group helicopter force from seven type/model/series to three, the MH-60 Sierra and MH-60 Romeo, and the MH-53E with the overall objective of greatly expanding war fighting capability while significantly reducing costs. This plan capitalizes on efficiencies of singular maintenance, logistics, and training pipelines, while satisfying the needs of both active and reserve forces. The Concept of Operations will change the helicopter force structure and command structure in order to get the maximum war fighting capability of these two new helicopters and the men and women who will fight with all three of them.

The Marine Aviation Campaign Plan is a vision for Marine Aviation to attain the highest possible combat readiness to support Expeditionary Maneuver Warfare while at the same time preserving and conserving our most precious assets: our Marines, our sailors, and our equipment. The Marine Aviation Campaign Plan incorporates technological advancements, innovative

personnel management, balanced operations tempo, and Operational Risk Management to make our aviation units even more prepared for combat operations.

Readiness is a key transformation objective for the Navy and Marine Corps. In pursuing this readiness, we must also ensure that we are exhibiting good stewardship of taxpayer dollars and meeting our warriors' needs and expectations. From the government perspective, forging better partnerships with the rotary wing industry is key to meeting our future objectives. As competition for dollars increases, these partnerships will be even more valuable.

Our current partnerships with industry have achieved much. Key rotorcraft industry partners are (1) Sikorsky, (2) Lockheed Martin, (3) Bell Helicopter Textron, (4) Boeing, (5) General Electric Aircraft Engines, (6) Rolls Royce, and (7) Northrop Grumman. They and numerous smaller companies form a cadre of suppliers to the Navy/ Marine Corps Team - building platforms and engines, designing systems and tools for complex applications, and investing dollars into research and development. This Government/Industry Team has made significant progress in the transformational process.

Although we've seen a downward trend in rotorcraft contractual funding over the past five years, we anticipate a major change in that trend. From 1998 to 2002, Navy/Marine Corps



rotorcraft programs spent \$6 billion with industry. From 2003 through 2008, we anticipate the business base to more than triple. Expanded business opportunities exist for our rotorcraft industry partners in the future.

Some recent milestones within our community include the following:

The MV-22 is designed to replace the Marine Corps CH-46E and CH-53D helicopters. It will be the Marine Corps' only medium lift assault support aircraft. The CV-22 is designed to provide Special Operations Forces with a high-speed, long-range, vertical take-off/landing aircraft capable of penetrating politically or militarily denied areas to support special operational missions and activities. To meet interoperability requirements the V-22 must have communication assets and frequency coverage, encryption devices, and data link protocols that are tactically effective. V-22 is being designed to be interoperable with U.S., Allied, combined, and coalition forces.

After two aircraft mishaps that identified major discrepancies in the aircraft flight control system, specifically in the hydraulics system and software, the V-22 program underwent a major restructuring. That effort included independent program reviews that were comprehensive, with the goal of ensuring that the organizational, technical, and programmatic issues have been adequately addressed, and the

development of a plan that represented a rational approach to return to flight-testing and program recovery. I am pleased to report that the program is now in the middle of a comprehensive flight test program that will demonstrate that the changes made to the V-22 over the last two years will yield the weapons system that is needed by the Marine Corps and the nation's Special Operations Forces. The initial flight test results, which have included high rate of descent (HROD) flight testing, a shipboard testing period aboard the USS IWO JIMA, and parachute drop testing at Fort Bragg, North Carolina, are promising.

We continue to work through the challenges facing our V-22 program, with positive results. We also have active oversight from the Office of the Secretary of Defense. All experts have been engaged, and we are performing to our test plan.

As of this week, the V-22 Test Team has flown 278 flight hours since the return to flight in late May 2002. The V-22 program is produced by Bell Helicopter Textron, Inc., Dallas/Fort Worth and Amarillo, Texas, and The Boeing Company, Philadelphia, Pennsylvania, with Rolls Royce as the engine supplier.

The AH-1Z and UH-1Y inherit the multitude of missions from the AH-1W and UH-1N, which involves coordinating, directing and executing attacks on ground targets in support of Marine

Air/Ground Task Force operations. The AH-1W Attack Helicopter is tasked with escort, close air support, supporting arms control, visual and armed reconnaissance, anti armor, anti helicopter, and anti fixed-wing operations.

The UH-1N is a combat utility helicopter tasked with airborne command and control, supporting arms control, special operations support, visual reconnaissance, and assault support operations. We are making great strides in our efforts to upgrade both aircraft.

Our current H-1 Fleet is facing obsolescence challenges on the modern, asymmetrical battlefield. The H-1 Upgrade Program is the most cost-effective alternative to replacing these aging and obsolescent platforms.

The H-1 Upgrade program, with Bell Helicopter Textron, Inc., Dallas/Fort Worth, Texas, as industry lead, is remanufacturing 180 AH-1W and 100 UH-1N helicopters to state-of-the-art AH-1Z and UH-1Y configurations. Both aircraft feature the latest technology in rotor and drive train design, avionics, sensors and weapons. Approximately 84 percent of the parts are common between these two aircraft, making them far more maintainable, supportable, survivable and deployable than current generation H-1 aircraft.

The UH-1Y complements the MV-22 in the assault support mission area, primarily in terms of small team insertions

(reconnaissance and surveillance) and its ability to operate in restricted landing zones due to urban terrain and obstacles.

The AH-1Z will continue to provide fire support and escort for the Marine ground forces with increased time-on-station, combat radius and ordnance.

The H-1Z/Y Upgrade features the largest single-piece composite component ever built for a rotary wing aircraft - the rotor yoke. The rugged composite structure of the rotor yoke is currently proving the importance of these survivability advancements. Current ballistics testing results show that it can take a direct hit from a 23mm weapon and maintain sufficient "fly home" integrity. In place of the old analog cockpit, the aircraft upgrade includes an all-glass digital cockpit and are incorporating the Thales Top Owl helmet-mounted display, which could become the standard Helmet Mounted Display for all Marine Corps rotorcraft. This helmet puts all flight data, Forward Looking Infrared imagery and Night Vision imagery right on the pilot's visor in a look-through presentation. General Electric Corporation, Lynn, Massachusetts, manufactures the T700 engines for all H-1 Upgrade aircraft.

The H-1 Upgrade program is a prime example of the importance of an Integrated Test Team. The H-1 Integrated Test Team is comprised of test pilots as well as military and civilian engineers, logisticians, and others who support the



team. Members include active duty military, government civilians, and industry partners.

The SH-60B Seahawk is an armed multi mission, ship based naval helicopter designed to extend the sensor range of surface combatants for anti submarine warfare as well as performing surface vessel surveillance, targeting, and destruction. The aircraft is based aboard cruisers, destroyers, and frigates.

The SH-60F is a carrier-based version of the H-60 that provides close in Anti Submarine Warfare protection for the Carrier Battle Group. Its AQS-13 dipping sonar is the only dipping sonar available to the Navy today.

The HH-60H armed helicopter is a carrier based variant of the H-60 that provides the Navy with a multi mission platform capable of conducting Navy's strike/special warfare support, Surface Warfare, and combat search and rescue.

The Navy's Helicopter Concept of Operations will ultimately reduce six different type/model/series of Navy helicopters currently operating to two new H-60 variants: the MH-60R and the MH-60S.

The MH-60R configuration, currently being tested at Patuxent River, Maryland, will replace the aging SH-60Bs and SH-60Fs starting in Fiscal Year 2007 and perform the Sea Shield missions of anti submarine warfare and surface warfare command and control and secondary rotary wing missions.

This new variant incorporates improved weapons, a new low frequency dipping sonar, imaging radar, upgraded electronic-support systems, and integrates the self-defense systems.

The MH-60S was approved for full-rate production in September 2002 and is currently deployed with three operational units/sites, HC-3 in North Island, San Diego, California, HC-5 in Guam, and HC-6 in Norfolk, Virginia. This aircraft is replacing the HH-60H, CH-46D, HH-1N, and H-3. The Sierra's primary missions are Anti Surface Warfare, Combat Search and Rescue, Naval Special Warfare support and Organic Airborne Mine Counter Measures. These missions will be incorporated through a Block Upgrade plan.

Sierras and Romeos are going to prove themselves in the battle groups of the future. Beginning in Fiscal Year 2008, under the current Concept of Operations, Carrier Battle Groups will begin the transition to the new aircraft. It is projected that each Carrier Strike Group will have 8 Sierras and 12 Romeos. (6 Sierras and 4 Romeos per carrier; 8 Romeos on surface combatants and 2 Sierras per Combat Logistics Force ship) Each Expeditionary Strike Group will have 2 to 4 Sierras and 2 to 4 Romeos.

Sikorsky Aircraft Corporation, Stratford, Connecticut, manufactures the H-60 series helicopters. The H-60 has been in production since the 1970s. Additionally, Lockheed Martin

Systems Integration, Owego, New York, is the lead avionics integrator for both the Romeo and Sierra. General Electric Corporation, Lynn, Massachusetts, manufactures the T700 engines for all H-60 series aircraft.

Dominant maneuver from the sea requires the rapid build up of force at the strategic point of decision. The H-53 provides the Navy and Marine Corps with the rapid heavy lift required to assure this capability. The MH-53E provides the dedicated airborne mine countermeasures critical to the Sea Shield, Sea Strike, and Sea Basing pillars of Sea Power 21. We are currently studying whether the MH-60S can replace the MH-53E in the dedicated airborne mine countermeasures role. In addition, Vertical Onboard Delivery of some heavy/large critical logistics items for the Carrier Battle Group is possible only with this asset.

The CH-53E allows the Marine Corps to transport its light armored vehicle and M198 Howitzer. The CH-53E is capable of lifting 32,000 pounds, transporting the load 50 nautical miles and returning. They can also retrieve downed aircraft. The aircraft are equipped with refueling probes giving indefinite range, and there are provisions to carry 55 troops.

The CH-53D primary mission is transportation of equipment, supplies, and personnel during the assault phase and subsequent operations ashore. Capable of lifting 14,000 pounds, it is one

of two Marine Corps medium lift helicopters scheduled to be replaced by the V-22.

H-53 industry partners are Sikorsky Aircraft Corporation, Stratford, Connecticut, and General Electric Corporation, Lynn, Massachusetts. The Marine Aviation Campaign Plan establishes the requirement to operate the CH-53E through the year 2025 with a continuing need for heavy lift to support expeditionary maneuver warfare and the underlying concepts of operational maneuver from the sea, other expeditionary operations, sustained operations ashore, and Sea Basing.

The H-46 helicopter has been the workhorse of Marine Corps helicopter aviation for over 30 years. The Marine Corps CH-46E performs assault support, medium lift and transport of combat troops during amphibious operations and subsequent operations ashore. The Navy CH-46Ds, HH-46Ds, and UH-46Ds perform critical replenishment of ships at sea. The HH-46Ds also perform search and rescue missions. The Boeing Company, Philadelphia, Pennsylvania, built H-46 aircraft in the 1960s and 1970s. It has had several major upgrades including: airframe conversions of H-46D and H-46F to CH-46E in the late 1970s, and the Safety, Reliability, and Maintainability Program which started in the late 1980s and completed in the early 1990s. H-46 aircraft are powered by two General Electric T-58 Series engines. The current plan is to retire most H-46D aircraft by 2004, with only



six Marine HH-46Ds flying search and rescue through 2015. The CH-46Es will gradually be reduced from the current 228 to 5 by 2015, the last year the H-46 will be in the rotorcraft inventory. USMC CH-46Es are scheduled to be replaced by the MV-22. Navy HH-46D will be replaced by MH-60S helicopters by September 2004.

The H-3 Sea King helicopter is in operational draw down phase and is scheduled to be completely phased out by 2009. There are 50 H-3s, which are designed for both ship and shore based operations to provide logistics support, range support, and search and rescue capability. Additionally, four H-3s are configured to provide Executive transportation and one serves as a test bed for modifications and improvements to the Presidential VH-3D. The H-3 was manufactured by Sikorsky Aircraft Corporation, Stratford, Connecticut.

The VH-3D Presidential Helicopter mission, is to provide helicopter transportation for the President and Vice-President of the United States, members of the President's Cabinet and Foreign Dignitaries as directed by the Director, White House Military Office. The VH-3D fleet is augmented by the VH-60N aircraft.

Both aircraft are shipboard compatible and air transportable in C-5 and C-17 aircraft, and both have VIP cabin

interior, extensive communications capability, self-contained navigation, and are Electro-Magnetic Pulse hardened.

Eleven VH-3D aircraft entered service in 1974/75, and eight VH-60N entered service in 1989. Both rotorcraft are produced by Sikorsky Aircraft Corporation, Stratford, Connecticut.

The Presidential Helicopter fleet does not participate in the joint force operational construct. All aircraft Communications Systems are interoperable with applicable existing Department of Defense, White House Military Office, and National Command Authority systems.

The VH-3D Replacement Programs Operational Requirements Document is currently being reviewed by the Joint Requirements Oversight Council. A proposed acceleration of the VH-3D Replacement Program of Record is under consideration. We have released a Broad Agency Announcement to Industry to assist the scope of the effort required to reconfigure and test new helicopters for the Executive Transport Mission.

As missions evolve, our acquisition processes are transforming to meet ever-changing demands in a joint operational environment. The Joint Requirements Oversight Council emerges as a principal forum in which senior military leaders address requirements from a joint perspective. For example, in a memo dated 23 August 2002, the Council validated and approved Change Three to the Operational Requirements

Documents for the Mid-Life Upgrade to the UH-1 and AH-1, to include the interoperability Key Performance Parameters. Another example of Council involvement is the recent review and approval of both the Mission Need Statements and Operational Requirements for the MH-60R and MH-60S programs. The Council revalidated the MH-60S Operational Requirement Document as part of the Full Rate Production decision and is in the process of reviewing the updated MH-60R Operational Requirement Document prior to Operational Testing.

As the Naval services seek to re-capitalize, we do so with a blueprint that has been validated by recent world events. In the past, under the "two major theater war" construct, naval forces deployed in two major configurations: the Aircraft Carrier Battle Group with embarked Air Wings and the Amphibious Ready Group with embarked Marine Expeditionary Units. Surface combatants and submarines did not typically deploy with the Amphibious Ready Group. This meant that in operations other than benign tactical conditions the amphibious ready group had to await in-theater augmentation from the Carrier Battle Group.

The new Global Concept of Operations organizes the fleet into Carrier Strike Groups, Expeditionary Strike Groups, and Surface Action Groups. This change involves more than just in-theater assignment of forces from Carrier Battle Groups to Amphibious Ready Groups, the new groups will train together and

deploy as a cohesive unit. In addition it transitions our naval forces from 19 to 37 independent strike groups. Navy/Marine rotorcraft constitute the common thread that effects the realization of these concepts, and it is with this backdrop that we look ahead to transition the technologies required to accomplish our vision.

As in all Navy/Marine Corps programs, safety is of primary concern. The average age of helicopters continues to increase while operations in the most demanding environments such as Afghanistan and the Persian Gulf become the norm. The plans that have been previously discussed provide a roadmap to replace aging aircraft with new aircraft that have improved capability to operate in these challenging environments.

The Navy and Marine Corps transformation is underway. We will continue to encourage our industry partners to seek innovative solutions to the challenges we face in meeting the Sea Strike, Sea Shield campaigns of the future. By working together we will be ready to take on new challenges and prevail against asymmetric threats.

Mr. Chairman, thank you again for this opportunity to share with the Subcommittee the challenges and successes of our Navy/Marine Corps rotorcraft communities.



2004 NATIONAL DEFENSE AUTHORIZATION REQUEST

**TESTIMONY  
BEFORE THE HOUSE ARMED SERVICES COMMITTEE,  
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES  
108<sup>TH</sup> CONGRESS**

**THE U.S. ROTORCRAFT INDUSTRIAL BASE**

**March 12, 2003  
5 p.m., Room 2118  
Rayburn Office Building**

**Presented by  
M.E. Rhett Flater  
Executive Director  
American Helicopter Society International**

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**TESTIMONY  
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M.E. Rhett Flater  
Executive Director  
American Helicopter Society International**

Mr. Chairman, my name is Rhett Flater and I am the Executive Director of the American Helicopter Society. It is a pleasure to appear before you today as you receive testimony on the fiscal year 2004 national defense authorization request and review United States' rotorcraft programs, the supporting industrial base and future technology initiatives.

The American Helicopter Society is the leading professional, technical society in the world dedicated to the advancement and promotion of vertical flight technologies, including the helicopter and tiltrotor. The Society was founded in 1943 by Igor Sikorsky and other industry pioneers, who recognized the benefits which vertical flight technologies offer mankind. Today, the Society is international in membership, with more than 6,000 members, most of whom are managers, engineers, scientists and technicians. Our membership also includes most large members of the U.S. rotorcraft industrial base, including airframe manufacturers Bell Helicopter Textron, Boeing Helicopter Division of Boeing Defense and Space Group, Sikorsky Aircraft Division of United Technologies, and Kaman Aerospace, engine manufacturers GE Aircraft Engines, Honeywell, and Rolls-Royce Corporation, and systems integrators BAE Systems, Honeywell, Lockheed Martin, Northrop Grumman and Raytheon.

I appear before you today to discuss the state of the United States rotorcraft industrial base, specifically as it relates to the ability of the industry to respond to future national and homeland security needs.

### General Overview

The major U.S. airframe manufacturers – Bell Helicopter Textron, The Boeing Company (helicopters) and Sikorsky Aircraft Corporation, a division of United Technologies Corp. - each have (2002) annual revenues from rotorcraft ranging from \$1.7 billion to \$2.8 billion. Total sales, as a group, have fluctuated between \$5 billion and \$6.6 billion during the past five years; in 2002 they were \$6.6 billion. Employment, meanwhile, has ranged from 24,000 to 27,200 during the past five years; in 2002 total worldwide employment for the group was 24,182. (See Appendix 1 for 10-year industry trends.)

Boeing's sales are entirely military-related. Sikorsky manufactures products for both the military and civil markets, including the S-76 and S-92. Bell's sales have historically been spread 50/50 between military and civil, but during the past three years Bell's civil/commercial sales have declined slightly. This is attributable partly to the economic downturn but also to competition from Eurocopter and other non-US manufacturers.

The U.S. rotorcraft industry also incorporates a large sub-systems supply base, spanning such critical fields as propulsion, avionics, communications and armaments. Recent industry forecasts predict a 10-year rotorcraft market for over 10,000 helicopters worldwide. Competition from government supported sub-systems suppliers such as BAE Systems, Turbomeca and Thales can be expected to challenge U.S. suppliers to fully exploit this market.

Foreign military sales by the major U.S. airframers comprise approximately one-third of their total worldwide sales. Propelled by demonstrated successes by U.S. military technology in Desert Storm, foreign sales have been essential throughout the decade of the 1990s in maintaining warm production lines. Without such sales, Boeing's CH-47 Chinook (heavy lift transport) line and Sikorsky's UH-60 Blackhawk (medium lift transport) line would be stagnant. Bell's sales of the AH-1W Supercobra (attack helicopter) to Taiwan have enabled it to retain a production capability which now permits Bell to bridge to AH-1Z and UH-1Y production (or remanufacture) for the U.S. Marine Corps. According to Aerospace Industries Association (AIA), total helicopter exports in 2000 were \$763.9 million. The industry's net contribution to the current account trade balance was \$274.6 million.

Key U.S. military programs include the V-22 Osprey, which will replace the Marine Corps' CH-46 (which has been in service since the mid-1960s); the Army's RAH-66 Comanche; the Navy's MH-60R and MH-60S model Seahawk; the Army's CH-47F Chinook, UH-60M Black Hawk and AH-64D Longbow Apache (all remanufacturing programs); and the Marine's AH-1Z/UH-1Y. The Osprey, built by Bell and Boeing, is in low-rate production. The RAH-66, built by Boeing and Sikorsky, remains in the engineering and manufacturing

development phase. The AH-1Z/UH-1Y is in flight test prior to full-rate remanufacturing.

For the U.S. rotorcraft industry, however, there have been no "new starts" within the past 15 years. The industry has largely survived, and to some extent prospered, based on remanufacturing existing airframes.

### European Industry: A Comparison

By comparison, sales of the major European airframe manufacturers – AgustaWestland Ltd. (formerly Agusta, SpA and Westland, Inc.) and Eurocopter (formerly Aerospatiale, S.A. and MBB Helicopters, GmbH) - have risen to \$2.4 billion and \$2.5 billion in 2002 respectively, an increase of more than 12% over the past year.

European manufacturers have recently introduced several new products competitive with U.S. rotorcraft, with Eurocopter alone having introduced 10 new designs over the past decade. In the military market, these include the AgustaWestland EH-101 medium lift maritime transport, the NH-90 medium lift transport produced by Eurocopter (France and Germany), AgustaWestland (Italy and Great Britain) Fokker (the Netherlands) and CASA (Spain), and the Tiger light attack helicopter – Eurocopter's answer to Boeing's Apache. In the civil market, they include the Agusta A-109, Eurocopter EC-120, EC-135, EC-145, EC-155, and EC-225 – nearly all of which are targeted at Bell's civil product line. The military products are racking up sales across Europe and increasingly winning international competitions, e.g., the NH-90 and the EH-101 beat out Sikorsky's S-92 in the "Nordic competition;" the NH-90 has become the medium lift airframe of choice in Germany, France and most western European countries (except for Great Britain and Italy which chose the EH-101). Several months ago, Eurocopter's Tiger won the Australia attack helicopter competition (22 aircraft) over the Apache (this is the Tiger's first major international win).

The European manufacturers are growing more aggressive in pursuing international orders and they now are selected over U.S. manufacturers on a frequent basis. European technology is as advanced - and in some cases more so - than U.S. technology: witness European advancements in blade design, composites, bearingless main rotors, transmission design, sensors, HUMS, etc. The European ability to integrate airframes, engines and systems is comparable equal to that of the U.S. primes.

The military rotorcraft market is global in nature. To sell products abroad, aerospace companies must offer significant economic offsets to the purchasing government. Accordingly, European primes are now teaming with major U.S. defense firms to meet future DoD needs. For example, AgustaWestland has recently teamed with Lockheed Martin to offer an American version of the EH-101 (the US-101). Similarly, the U.S. primes are teaming with European



companies. An example is Boeing's teaming with GKN Westland (now AgustaWestland) and BAE Systems on the WH-64D Longbow Apache for the British Army.

Compared to the U.S., European host governments consistently, and heavily, subsidize rotorcraft research and development. For example, rotorcraft research funding in France is supplied by the military (64%) and by the civil (36%) sectors of the government. Of these funds, 34% support basic research and 66% technology and development programs. European government test facilities are modern to state-of-the-art compared to those in the U.S. Examples include the DNW (Netherlands) wind tunnel, CIRA's (Italy's) new crash test facility and its new icing wind tunnel, both located at Padua. Russia's TsAGI has three large low speed tunnels that are used extensively for studies of helicopter rotors and complete configurations, e.g., the T-101, T104 and T-105. The European Union supplements its member state basic R&D funds via European Commission "framework programs." As the **Commission on the Future of the United States Aerospace Industry** recently reported, "in contrast to declining NASA and FAA funding, framework funding has increased dramatically since 1987." EU supplemental funding for aeronautics research jumped to nearly \$1 billion annually in the sixth EU framework program (2002-2006).

There are also a number of new centers of rotorcraft excellence emerging beyond Europe, again with the help of government funding. These include the helicopter industries of India, China, Japan and Korea. Closer to home, Canada also continues to support home-grown rotorcraft technology development through its TPC funding programs.

### **Basic Rotorcraft Research In Decline in the U.S.**

Attached as Appendix #3 is the Society's best estimate of the state of DoD rotorcraft science and technology and NASA research and technology programs for the period 1994 through 2004, with projections for fiscal years 2005 through 2007. Please note that during the period from 2001 through 2003, rotorcraft research declined performed by DoD and NASA declined from \$113.6 million to \$56.3 million, largely because of NASA's failure to fund rotorcraft research.

Long-term cooperative efforts between NASA and the Department of Defense in rotorcraft research, in particular the 1969 Army NASA Joint Agreement, are in serious turmoil. Facing internal budget pressures, NASA has eliminated all of its rotorcraft R&D activity in fiscal years 2002, 2003 and 2004. In the face of a growing European rotorcraft industry, the future competitiveness of U.S. capabilities in both military and commercial rotorcraft technology development is in jeopardy. If the trend continues, the U.S. Defense Department may eventually become dependent on non-U.S. suppliers for future mobility requirements. In its Third Interim Report, the **Commission on the Future of the U.S. Aerospace Industry** ("the Commission") issued a recommendation that "the Administration

and Congress should direct NASA and the DoD to coordinate R&D efforts in areas of common need and provide the appropriate funding for joint programs. For example, funding for joint Army/NASA rotorcraft R&D efforts should be restored." See Commission Recommendation 5.

The rotorcraft industry is a significant part of the U.S. aerospace industrial base. Several findings by the **Commission on the Future of the U.S. Aerospace Industry** regarding the industrial base are especially relevant to the rotorcraft industry. For example:

- There is a major workforce crisis in the aerospace industry. Our nation has lost over 600,000 scientific and technical aerospace jobs in the past 13 years. These layoffs initially began as a result of reduced defense spending following the end of the Cold War. But subsequent contraction of the industry through mergers and acquisitions and the events of September 11 have made the situation worse.
- Aerospace is a technology-driven industry, heavily dependent on defense defense, research and manufacturing. Yet aerospace procurement by the military fell nearly 53 percent from 1987 to 2000. The DoD also reduced its overall investment in research, development, testing and evaluation by nearly 20 percent from 1987 to 1999.
- Maintaining a world-class national aerospace RDT&E infrastructure is essential to ensure that this country's research programs can be performed successfully. Yet much of the U.S. RDT&E infrastructure is 40 to 50 years old and marginally maintained. Currently, NASA has suspended all operations of the 40x80 windtunnel (the NFAC) located at NASA Ames and has threatened to close it permanently. This is a significant blow to the rotorcraft industry which depends on full-scale testing and access to NFAC. In addition, NASA has announced the imminent closure of the nation's only crash-safety flight test facility located at NASA Ames. Accordingly, crash safety tests planned for the RAH-66 Comanche and the Joint Strike Fighter in 2005 must be performed in a European facility or cancelled altogether.
- Industry-funded aerospace research and development fell by 37 percent from \$8.1 billion in 1986 to \$5.1 billion in 1999 (in inflation adjusted dollars). Absent government procurements, private firms have little incentive to fund basic research on their own because capital markets and stockholders shy away from risky investments with indeterminate returns.
- During the same timeframe, the number of major U.S. aerospace prime contractors shrank from more than 50 to just five. Meanwhile, aerospace firms continue to consolidate to maximize resources, eliminate excess

capacity, and access new market segments. Parts suppliers have undergone a similar contraction and consolidation.

Given (1) the loss in U.S. rotorcraft market share brought about by the decline in U.S. investment (NASA, DoD, and Industry) in basic research and (2) the availability of equivalent or better European technology supported by aggressive R&D programs with the stated objective of overtaking the U.S. in rotorcraft sales, it should be clear that the U.S. government must support sustained research, e.g., specifically, the DoD and NASA must provide sustained and predictable investments in basic aeronautics research, including rotorcraft. If this does not occur, the U.S. rotorcraft capability - until recently regarded as the best in the world - will decline.

This development will have significant implications for U.S. homeland security as well as national transportation planning. Rotorcraft fill many needs which non-VTOL aircraft are incapable of addressing. Not only do they provide battlefield mobility for the U.S. military but also emergency response in times of national and homeland security emergencies. They save lives in the event of natural and man-made disasters. And Department of Transportation studies indicate that "runway independent aircraft," such as helicopters and tiltrotors, are capable of increasing aviation system capacity and reducing congestion and delays. For these reasons, further investment in basic research is essential for national security which requires the U.S. industry to remain competitive in world markets.

#### **AHS International "White Paper"**

A "White Paper" issued by the Society emphasizes the importance of basic rotorcraft research to address future national and homeland security needs as well as public transportation needs in the following terms:

#### **Rotorcraft fulfill critical needs as part of the national infrastructure.**

Rotorcraft currently perform widespread safe and affordable critical public service and other operations such as emergency medical service, search and rescue, law enforcement, firefighting, resource development, and priority transportation.

Recent research indicates that rotorcraft can make a major impact in alleviating airport congestion and delays by enabling runway-independent VTOL aircraft. *For example, a recent study showed that simultaneous non-interfering operations of runway-independent aircraft for short-haul flights could achieve a two-thirds reduction in ground delays projected for 2017 at Newark airport.*

The national rotorcraft technology and production base also supports critical national and homeland security needs for improved mobility.

**To meet these needs, there is a compelling need for rotorcraft research.**

Research is needed to serve these public needs and to maintain a healthy industry in the face of limitations of current rotorcraft and intensifying international competition. Growing investment in rotorcraft research by foreign entities has eroded and, in some cases, overcome U.S. leadership in rotary wing technologies; as a result European industry now has captured half of the world's civil market.

**Cost** is a major inhibitor to expanded rotorcraft operations. Current rotorcraft cost at least three times as much to operate as equivalent turboprops, limiting rotorcraft applications and potential ridership. This relationship is determined largely by cruise efficiency, empty weight, speed, complexity, and development and certification cost and time – all of which are being attacked by vigorous technology efforts.

**These same attributes, and especially range and cruise efficiency** are also vital to the military. Next-generation VTOL military transports will have to operate at much greater ranges than the current generation—up to 600 miles—yet be able to land in and take off from confined areas or ships almost anywhere in the world with minimum logistic support.

**Safe all-weather 24/7 operations** are critical to the efficient exploitation of the advantages of vertical flight. The very nature of the unique capabilities of rotorcraft lead us to use them in both military and civil applications where no other alternative exists. The public perception that rotorcraft flight is inherently risky derives from the fact that rotorcraft are often called upon to operate in bad weather at very low altitudes and in close proximity to ground-based obstacles such as towers and wires.

**External noise** is a critical factor in achieving public acceptance of rotorcraft operations. Quiet environmentally-friendly aircraft will be needed to operate from hub airports, general aviation airfields, and dispersed heliports, thereby maximizing time savings for travelers. In the case of military applications, external noise impacts the ability of the military to operate from bases in close proximity to populated areas, not to mention the obvious loss of stealth.

**Other barriers** to enhanced and expanded civil operations include ride comfort and reliable near all-weather operations. Overcoming these barriers is needed to attract passengers and provide public service, such as emergency medical service.

**What is NASA's role?**

NASA's role has always been to conduct high-value research that will enable the introduction of new aeronautical technologies or products. The risks and long time horizons for financial returns from such research fail to meet industry criteria for private investment. For example, NASA research played a key role in the development of tiltrotor technology beginning in 1971, including joint sponsorship



of the XV-15 technology demonstrator, that is only now beginning to provide returns to the industry and the public.

NASA funding for rotorcraft research is highly leveraged. Recognizing that many technologies are applicable to both military and civil rotorcraft, under a NASA/Army Joint Agreement the two agencies share 50/50 in supporting rotorcraft research. The Army and NASA funding for the National Rotorcraft Technology Center is further matched by Industry, providing four-to-one leverage for NASA investment in that program, which has been cited as a model for government-industry-academia partnership. Equally important, these programs provide very effective mechanisms for technology transfer among the participants.

Examples of possible NASA/DoD contributions include:

- **Concepts for innovative new configurations** can radically improve rotorcraft speed, affordability, and mission effectiveness, while retaining superior VTOL and low-speed characteristics.
- **Applications of information and computing technologies** will result in safer, more affordable, environmentally-friendly rotorcraft and far more effective and survivable military systems. These technologies can enable safe near all-weather operation in confined urban areas, particularly important for scheduled transport and public service operations.
- **Active and adaptive controls** have demonstrated the potential to improve performance, and reduce external noise, internal noise, vibration, and weight and mechanical complexity.
- **Noise reducing design and operational methods** have demonstrated noise reductions totaling 20 dB (i.e., 75% reduction), but continued research is needed to achieve this for future rotorcraft configurations.
- **Design tools** can reduce development cycle time by 50%, speeding up the application of technology improvements. These include physics-based models, such as advanced structural analysis and computational fluid dynamics, that lead to improved performance, noise, and vibration characteristics. These methods are needed to optimize designs and to "get it right the first time," avoiding costly redesign and retest, particularly for innovative aircraft configurations.
- **Deice and anti-ice concepts and certification methods** are needed for affordable and reliable all-weather operation. Operation of rotorcraft in icing conditions currently requires complex (hence costly and sometimes unreliable) systems and is difficult, costly, and time consuming to certify for civil operation.

Future research addressing these barrier technologies will bring about radical improvements that will achieve the characteristics needed to contribute to national security as well as the air transportation system of the future.

### Conclusion

Companies such as Bell, Boeing and Sikorsky and their supporting suppliers are innovative. They also have responsive, can-do senior managers and proven and experienced management teams which partner well with their customer. When called upon, they are capable of responding with alacrity to national security and civil market needs.

In conclusion, I would make three recommendations.

- First, the DoD and NASA should be directed to make further investments in basic 6.1 and 6.2 rotorcraft research – particularly efforts to refine and simplify the rotor system and control systems and the drive train - a high priority.
- Second, given the importance of transforming the U.S. military to become more mobile and more agile – a requirement in fighting future 21<sup>st</sup> century wars - the DoD should fund private industry to design, develop and fly a series of innovative VTOL prototype aircraft.
- Third, this Committee should pay particular heed to implementing the recommendations of the **Commission on the Future of the U.S. Aerospace Industry** contained in the Commission's Final Report issued November 17, 2002 highlighted in Appendix 2 to this testimony.

Rapid passage of the recently reintroduced "Aeronautics Revitalization Act of 2004" would go far in addressing these national concerns.

Thank you, Mr. Chairman.

**Rotorcraft Industry Trends  
For the Period 1993 - 2002**

<u>Year</u>	<u>Total Employees</u>	<u>Total Revenues (Billions US)</u>
1993	28,293	\$5.086
1994	27,606	\$5.121
1995	26,190	\$5.445
1996	25,821	\$4.632
1997	27,526	\$4.505
1998	27,214	\$5.048
1999	25,534	\$5.072
2000	24,899	\$5.482
2001	25,324	\$5.865
2002	24,182	\$6.616

\* Includes total revenues and employees for the years ending December 31, 1993 through December 31, 2002 for Bell Helicopter Textron, The Boeing Company (rotorcraft revenues only), McDonnell Douglas Helicopter Company (1993-1996), and Sikorsky Aircraft Corporation.

**Stakeholder's Coalition**  
**"Final Report of the Commission on the**  
**Future of the U.S. Aerospace Industry"**

**Summary Findings**  
**Research and Development Committee**

The Stakeholder's Coalition R&D Committee has identified several key recommendations relating to the need for national R&D goals contained within the Final Report of the Commission on the Future of the U.S. Aerospace Industry, consolidated, reworded and modified as follows:

1. The White House and Congress must increase and sustain funding in long-term research and associated RDT&E infrastructure to develop and demonstrate new breakthrough aerospace capabilities. (Rec. #123; Com. Rep. at 9-8 and 9-12; see also Rec. #111; Com. Rep. at 4-6)
  - (a) NASA should reenergize its aeronautics research efforts and, within the next five years, double its investment in aeronautics. (Rec. #9; Com. Rep. at 9-3, 9-11, 9-13; Rec. #123; Com. Rep. at 9-8 and 9-12)
  - (b) The Federal government must assume responsibility for providing, sustaining, and modernizing critical aerospace RDT&E infrastructure to ensure that this country's research programs can be performed successfully. (Rec. #116; see Com. Rep. at 4-12 and 4-14; Rec. #123; Com. Rep. at 9-7 and 9-12.)
  - (c) DoD's annual science and technology (6.1-6.3) funding must be sufficient (not less than 3 percent DoD obligation authority) and stable to create and demonstrate the innovative technologies needed to address future national security threats. (Rec. #113; see Com. Rep. at 4-7.)
  - (d) The Administration and Congress should direct NASA and the DoD to coordinate R&D efforts in areas of common need and provide the appropriate funding for joint programs. (Rec. #24; Com. Rep. at B-39.)
2. Industry and government should accelerate research transition reducing the time from concept definition to operational capability by 75 percent through coordinated national goals; aggressive use of information technologies; incentives for real government, industry, labor, and academia partnerships; and an acquisition process that integrates science and technology as part of the product development process. (Recs. # 103, 104, and #8; Com. Rep. at 9-10/12).
3. To focus U.S. aerospace research investments on developing breakthrough capabilities, the Administration should adopt – as a national priority – the achievement of the following aerospace technology demonstration goals by 2010



- Demonstrate an automated and integrated air transportation capability that would triple air system capacity by 2025;
- Reduce aviation noise and emissions by 90 percent;
- Reduce aviation fatal accident rate by 90 percent;
- Reduce transit time between any two points on earth by 50 percent.
- Reduce cost and time to access space by 50 percent;
- Reduce transit time between two points in space by 50 percent;
- Demonstrate the capability to continuously monitor and surveil the earth, its atmosphere and space for a wide range of military, intelligence, civil and commercial applications;

(Rec. 8; Com. Rep. at 9-8)

Other Committee Items of Interest:

As the Commission found, "there is a workforce crisis in the aerospace industry" which must have access to a scientifically and technically trained workforce. The recommendations of the Commission relating to "Workforce" contained at Chapter 8 of the Final Report are of considerable importance to the future health of U.S. R&D, particularly recommendations #22, #23, #118, #119, and #122.

Kathryn Holmes, ASME  
M.E. Rhett Flater, AHS Int'l  
Co-chairs, R&D Committee

## DoD and NASA Dual-Use Rotorcraft Investment

	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07
<b>— DoD</b>														
Army 6 <sup>1</sup>	\$8.40	\$8.20	\$7.99	\$8.41	\$7.85	\$8.49	\$9.43	\$9.92	\$9.74	\$12.08	\$12.29	\$12.47	\$13.00	\$13.19
Army 6.2 <sup>2</sup>	\$18.50	\$17.90	\$17.44	\$20.70	\$23.30	\$22.14	\$20.84	\$20.74	\$20.31	\$24.48	\$26.46	\$28.67	\$23.76	\$22.77
Army 6.3 <sup>3</sup>	\$17.40	\$17.30	\$17.72	\$17.34	\$18.64	\$23.49	\$20.84	\$20.80	\$30.52	\$20.06	\$27.48	\$24.65	\$20.66	\$24.75
DoD Bridge									\$12.50					
DARPA					\$4.70	\$3.90	\$5.35	\$6.40						
Navy (UH1MS)					\$4.00	\$3.50	\$2.60	\$1.70						
<b>DoD Total</b>	\$44.30	\$43.40	\$43.15	\$46.45	\$59.49	\$52.02	\$59.96	\$60.46	\$74.77	\$58.62	\$66.24	\$63.79	\$57.42	\$60.71
<b>— NASA</b>														
NASA - Base Program														
Original Program	\$35.10	\$34.20	\$33.40	\$32.50	\$32.60	\$27.20	\$26.92	\$26.65	\$0.00					
Congressional Earmark								\$5.00	\$12.50					
Total Base Program	\$35.10	\$34.20	\$33.40	\$32.50	\$32.60	\$27.20	\$26.92	\$31.65	\$12.50					
SHCT	\$3.40	\$7.60	\$7.30	\$11.20	\$10.10	\$8.90	\$8.20	\$3.40	\$0.00					
(N)Salary (est)	\$20.00	\$19.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00					
<b>NASA Total (w/o Larsen)</b>	\$58.50	\$60.80	\$58.70	\$61.70	\$60.70	\$54.10	\$53.12	\$53.05	\$30.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
NASA Salary Projection										\$18.00	\$19.00	\$20.00	\$21.00	\$22.00
Larsen Bill Funding										\$18.00	\$40.00	\$40.00	\$50.00	\$50.00
<b>NASA Total (w/Larsen)</b>	\$58.50	\$60.80	\$58.70	\$61.70	\$60.70	\$54.10	\$53.12	\$53.05	\$30.50	\$18.00	\$59.00	\$60.00	\$61.00	\$72.00
<b>National Program (w/o Larsen)</b>	\$102.80	\$104.20	\$101.85	\$108.15	\$119.19	\$116.12	\$113.08	\$113.51	\$105.27	\$56.62	\$66.24	\$63.79	\$57.42	\$60.71
<b>National Program (w/Larsen)</b>	\$102.80	\$104.20	\$101.85	\$108.15	\$119.19	\$116.12	\$113.08	\$113.51	\$105.27	\$74.62	\$125.24	\$123.79	\$118.42	\$132.71
<sup>1</sup> Totals from AG1A & AH45; 75% of AH42, AH66, and AF20 from ARL support; and RCDE portion of BH59.														
<sup>2</sup> Total of AATA minus militarization specific workpackages & inclusive of NRTC.														
<sup>3</sup> Total of Selected Projects from Programs D313, D447, and D436.														
(Dollars are adjusted from DoD totals to reflect only Dual-Use Technologies. Militarization items such as signature suppression, weapons, sensors, and 45 percent of situational awareness are omitted. Totals are rounded to nearest 10K)														

## DoD and NASA Dual-Use Rotorcraft Investment

(\$ Million)	FY64	FY65	FY66	FY67	FY68	FY69	FY70	FY71	FY72	FY73	FY74	FY75	FY76	FY77
Army 6.1 Funding														
AS1A							\$1.61	\$1.65	\$1.59	\$2.86	\$3.46	\$3.51	\$3.87	\$3.66
AH45							\$1.86	\$1.97	\$1.94	\$2.19	\$2.23	\$2.35	\$2.40	\$2.40
AFDD Subtotal							\$3.06	\$3.49	\$3.02	\$5.07	\$5.69	\$5.78	\$6.02	\$6.06
75% of AH42							\$1.22	\$1.39	\$1.47	\$1.52	\$1.82	\$1.69	\$1.79	\$1.82
75% of AH66							\$0.88	\$1.03	\$1.08	\$1.12	\$1.26	\$1.25	\$1.35	\$1.39
75% of AH84							\$7.48	\$9.52	\$10.25	\$13.99	\$12.86	\$12.77	\$12.90	\$13.60
75% of AF20							\$1.53	\$1.82	\$1.85	\$2.13	\$1.69	\$1.73	\$1.84	\$1.89
ARL Subtotal w/AH84							\$11.11	\$13.76	\$12.95	\$14.83	\$19.00	\$17.26	\$17.88	\$18.71
ARL Subtotal w/o AH84							\$3.63	\$4.24	\$4.40	\$4.56	\$5.01	\$4.60	\$4.98	\$5.11
AFDD + ARL Subtotal w/AH84							\$14.17	\$17.25	\$16.57	\$18.36	\$24.07	\$22.95	\$23.80	\$24.79
w/o AH84	\$6.40	\$6.20	\$6.05	\$6.46	\$6.35	\$6.69	\$7.73	\$8.02	\$8.11	\$10.08	\$10.29	\$10.47	\$11.00	\$11.19
RCOE portion of BH59	\$2.00	\$2.00	\$1.94	\$1.95	\$1.50	\$1.80	\$1.70	\$1.90	\$1.63	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00
Grand Total (w/AH84)	\$2.00	\$2.00	\$1.94	\$1.95	\$1.50	\$1.80	\$1.70	\$1.90	\$1.63	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00
Grand Total (w/o AH84)	\$8.40	\$8.20	\$7.99	\$8.41	\$7.85	\$8.49	\$9.43	\$9.92	\$9.74	\$12.08	\$12.29	\$12.47	\$13.00	\$13.19
Rotorcraft Centers of Excellence														
Army (BH59)	\$2.00	\$2.00	\$1.94	\$1.95	\$1.50	\$1.80	\$1.70	\$1.90	\$1.63	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00
NASA			\$0.40	\$0.32	\$0.84	\$0.60	\$0.40	\$0.50	\$0.87	\$2.00	\$0.30	\$0.30	\$0.30	\$0.30
Total	\$2.00	\$2.00	\$2.33	\$2.27	\$2.34	\$2.40	\$2.10	\$2.40	\$2.30	\$2.30	\$2.30	\$2.30	\$2.30	\$2.30
FAA						\$0.00	\$0.20	\$0.80	\$0.40	\$0.80				

## DoD and NASA Dual-Use Rotorcraft Investment

Data for Charts (from above calculations and inputs)																
Chart 2																
	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07		
DoD -- S&T	\$44.3	\$43.4	\$43.1	\$48.5	\$58.5	\$62.0	\$60.0	\$60.5	\$74.8	\$56.6	\$66.2	\$63.8	\$57.4	\$60.7		
NASA -- Salary	\$20.0	\$19.0	\$18.0	\$18.0	\$18.0	\$18.0	\$18.0	\$18.0	\$18.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0		
NASA -- Base R&T	\$38.5	\$41.8	\$40.7	\$43.7	\$42.7	\$36.1	\$35.1	\$30.1	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0		
NASA -- Congressional Plus-Up	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$5.0	\$12.5	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0		
Army																
DoD Only	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07		
Army 6.1	\$8.4	\$8.2	\$8.0	\$8.4	\$7.8	\$8.5	\$9.4	\$9.9	\$9.7	\$12.1	\$12.3	\$12.5	\$13.0	\$13.2		
Army 6.2	\$18.5	\$17.9	\$17.4	\$20.7	\$23.3	\$22.1	\$20.8	\$20.7	\$20.3	\$24.5	\$26.5	\$26.7	\$23.8	\$22.8		
Army 6.3	\$17.4	\$17.3	\$17.7	\$17.3	\$18.6	\$21.5	\$20.8	\$20.8	\$30.5	\$23.1	\$27.5	\$24.6	\$20.7	\$24.8		
DAFPA	\$0.0	\$0.0	\$0.0	\$0.0	\$4.7	\$3.9	\$3.4	\$5.4	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0		
Navy (JHUMS)	\$0.0	\$0.0	\$0.0	\$0.0	\$4.0	\$4.0	\$3.5	\$2.6	\$1.7	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0		
DoD Bridge	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$12.5	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0		
NASA																
NASA Only	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07		
NASA -- Salary	\$20.0	\$19.0	\$18.0	\$18.0	\$18.0	\$18.0	\$18.0	\$18.0	\$18.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0		
NASA -- Base R&T	\$38.5	\$41.8	\$40.7	\$43.7	\$42.7	\$36.1	\$35.1	\$30.1	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0		
NASA -- Congressional Plus-Up	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$5.0	\$12.5	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0		
NASA Salary Projection										\$18.0	\$19.0	\$20.0	\$21.0	\$22.0		
Larson Bill Funding										\$40.0	\$40.0	\$40.0	\$50.0	\$70.0		
Total																
DoD -- S&T	\$44.3	\$43.4	\$43.1	\$48.5	\$58.5	\$62.0	\$60.0	\$60.5	\$74.8	\$56.6	\$66.2	\$63.8	\$57.4	\$60.7		
NASA -- Salary + Total R&T	\$58.5	\$60.8	\$59.7	\$61.7	\$60.7	\$54.1	\$53.1	\$53.1	\$30.5	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0		
(NASA Total includes Congressional Plus-Ups)																



**Testimony of John R. Murphey**

**Chairman and Chief Executive Officer,  
Bell Helicopter Textron**

**to the House Armed Services Committee**

**Subcommittee on Tactical Air and Land Forces**

**12 March 2003**

**John Murphey's Testimony to the HASC Subcommittee  
on Tactical Air and Land Forces  
12 March 2003**

Good afternoon. I am John Murphey, Chairman and Chief Executive Officer of Bell Helicopter-Textron. On behalf of Bell Helicopter, I would like to thank the Chairman and members of this Committee for giving me the opportunity to testify on behalf of the rotorcraft industry.

**The American rotorcraft industry is at a crossroads.** Near term decision by Congress may very well determine if the United States maintains its leadership in military and civilian rotorcraft or if both of these important markets are to be dominated by foreign companies.

At a time when the forces of international terrorism threaten the lives and property of Americans inside our own borders, this nation has never been in greater need of the kind of aircraft we build – and of our capacity to innovate and make our rotorcraft even better. In such areas as border patrol, anti-terrorist operations, emergency evacuation and disaster relief, we in the rotorcraft industry foresee an ever-growing requirement for increased mission capability, flexibility and leap-ahead technology. **But government investment in aerospace – so strong on the fixed-wing side – is sorely deficient on the rotorcraft side of the street.**

Bell is a balanced commercial/military rotorcraft company – *the only one in North America*. That product mix lets us balance the ebb and flow of military contracts. But maintaining that commercial/military balance is becoming more difficult at a time in history when keeping that leadership and maintaining that capacity in both military and civil rotorcraft is increasingly becoming more important to our nation.

### **Turbulent Times**

By any measure these are turbulent times.

The world has entered a very volatile period with a synchronized global economic downturn, the evolving war on terror, related regional conflicts.

The global **economic indicators** tell the story:

- The US continues to pull slowly out of recession with 2% GDP growth in 2002, an improvement on the stalled economy of 2001 when the growth rate was only 0.3%.

Although these top-line economic numbers are bad enough, they mask the true weakness in those parts of the economy that most affect the aviation market. **Corporate profits** are down and this is having a big impact on **business investment**. With weak profits, businesses are postponing or delaying capital investments. Helicopters are big capital investment items: big for the manufacturers and big for the buyers.

- US Corporate profits have been declining for 5 years, are down 30% since mid-1997 and presently at 1994 levels.
- With profits down, businesses have cut back on capital investments. Businesses' fixed investment levels have declined over 8% in the last 2 years.
- With the exception of China, that scenario is playing out in the rest of the world.

**This is a serious recession for those of us in the capital cycle. It is the most turbulent business environment we have seen in at least 10 years.**

### **Impact on Aviation and Rotorcraft Industry**

What does this mean for the aviation industry in general and rotorcraft industry in particular?

The aviation industry has been one of the hardest hit of any sectors of the economy both domestically and internationally. Across the whole sector – from new aircraft orders, to deliveries, to the volume of airline traffic – there has been a precipitous decline in activity.

- Large **aircraft orders** have collapsed by over 50% since 2000.
- Large **aircraft deliveries** lag the order collapse, but they still declined 35% from 2000 to 2002 — US **airline passenger miles** went down almost 10% last year, on top of a 7% decline in 2001.
- Major **US airlines** have lost billions of dollars since 2001 and are going bankrupt – and 12% of the large and regional jet **fleet** is now parked.

The commercial helicopter market has not been spared these overall effects and has suffered like other parts of the aviation industry. **Commercial helicopter deliveries** have declined over 30% year to date as our customers adopt a “wait and see” approach.

It is hard to avoid bad news in the aviation industry these days and there is no sign of the overall trend reversing in the near term.

### **Seizing the Opportunity**

There is no doubt about the turbulent times and the impact on the overall aviation industry – but what about the opportunities?

I have intentionally spent some time painting the picture of the “present state” of the aviation industry, and it is not a pretty one. Turbulent times would probably be an understatement. This is probably not news to anyone, but we need to understand that background if we are going to achieve success in the future – and that is where I want to focus.

**With the proper partnership between Government and Industry, the future could be very bright for the rotorcraft industry.** We are probably in one of the



most attractive sectors of the aviation industry for at least the next 5 to 10 years. Turbulence means change – it creates winners as well as losers, benefiting those who can adapt – and even more, those who do not simply adapt to change, but can lead it. In addition, there are always activities that are less susceptible to, or even independent of, near-term economic swings. As an industry we need to focus on these winners and emphasize activities that beat the economic swings in the short and long term. **Transformation is not limited to the military.** We must also transform how we as a nation fund the advanced rotorcraft technologies that our nation needs for its economic development and our own national defense.

The need for rotorcraft – both civil and military – continues to expand. Just look at the roles that helicopters play in the war on terror – from the dramatic Special Operations missions in Afghanistan to the daily, bread and butter survival piece of heliborne logistics. There simply was no other way to fight the cave and bunker battles in the highlands without rotorcraft. It would be hard to envision *any* modern conflict without their use. Our nation's security within our borders will depend more and more on tiltrotors and helicopters for border patrol, Coast Guard operations, and an array of "first responders" in police, fire, sheriff, and National Guard units across America.

**But as these requirements and mission expansion continues, the government's investment in rotorcraft S&T and R&D must keep pace – *and it is clearly out of sync.*** At a 3-4% level of investment in R&D, we will never reach the leap-ahead capabilities that this nation *demands*. We need your help to ensure that this changes.

A) The military market ~ Even in the face of a severe overall aircraft industry downturn, the overall rotorcraft market has the capacity to grow strongly, primarily driven by the North American military market. Rotorcraft provide the kind of capability needed for today's military missions, from surveillance to troop

movement to offensive and defensive combat. With this emphasis on flexibility, ease of deployment and mission capability, rotorcraft are well aligned with the transformational activities of the DoD. Military planners recognize these benefits and should recognize that rotorcraft continue to demand a larger and larger share of the growing DoD Procurement and RDT&E budget. The war on terror and the needs of Homeland Defense should only serve to reinforce that growth. **But that R&D demand is not being met. Production rates are down, production quantities are down, and investment in rotorcraft S&T and R&D in the single digits can only be described as pitifully low.** Every year the rotorcraft industry and the American Helicopter Society fight for an absurdly small level of rotorcraft R&D funding from NASA. In 2002 you helped restore some critical funding for rotorcraft. The last three years (02-04) that amount has been zeroed as a starting point – yet the commitment to rotorcraft R&D is part of NASA's charter. **This must stop.**

**The French government funds fully 100% of rotorcraft R&D. We aren't asking for that level of support – but we are asking for a fair share.**

B) Service and Support Business ~ Service and support activities are a key element of the overall rotorcraft market. The installed base is over 60 times the size of the new ship market. Service and support activities for the installed base will provide the industry near-term stability and long-term growth opportunities and a balance against the short-term volatility of ship sales, particularly in the commercial market. They also provide an ongoing relationship with our customer base and the continuing opportunity to upgrade mission capability and improve the performance and availability of our ships. While this segment of our business provides jobs and profits to our companies it does nothing to improve our technology base and provide for the future product needs of our military and commercial customers.

C) Innovation ~ Innovation is the foundation of this opportunity - innovative products and technologies are driving military procurement and RDT&E growth. We need to continue to innovate to keep the rotorcraft market growing and profitable. We need to work with our customers and our suppliers to make sure that the right solutions are developed to satisfy our customers' requirements.

**The Bell Boeing V-22 and our Tiltrotor UAV, the Bell Eagle Eye, as well as our commercial tiltrotor, the BellAgusta BA609 are good examples of an innovative product fueling market growth.** These very programs that are serving our nation today are the result of Government support and funding and Industry partnership in developing tiltrotor technology in the 1950's.

Just as we have seen innovative products expand the military market, we believe that the same effect can and will happen in the commercial market. **Tiltrotor products such as the BA 609** will expand the commercial rotorcraft market by providing a dramatic expansion of the traditional mission capability.

The materials and systems innovations that enable these revolutionary aircraft will trickle down to traditional helicopters over the coming years and drive market expansion. Any significant improvement in noise, speed, operating cost or utility would serve to expand the traditional helicopter market. There should be just as much government investment on the rotorcraft side as there is in the fixed-wing side.

D) Cost reduction ~ Sadly, **low volumes and high development costs** are a fact of life in the rotorcraft market, making cost a continuing challenge, both for current operational activities and for long-term product planning. We in industry are aggressively managing our cost and trying to keep ahead of the cost curve to insure our own profitability and allow us to provide greater value to our customer. Cost is a critical factor for all our customers from the biggest to the smallest. **But DoD and Congress must help us,** by working to establish rotorcraft

production rates that match those of fixed-wing aircraft programs. The vibrant rotorcraft industry that I have just elaborated upon cannot become a reality as long as rotorcraft companies are treated like second-class citizens when it comes to production. To be truly effective, and for both government and industry to reap the most benefits, industry cost-reduction actions must be combined with increased R&D investment, higher and more efficient production rates and cost-saving multi-year buys.

Cost is the challenge, but luckily there are plenty of actions we can take and processes we can adopt to control these costs. At Bell we have divested – and are continuing to divest ourselves of our non-core work. We pride ourselves on our world-class core competencies of thick composite manufacturing, very high tolerance gear machining, systems integration and assembly and those will remain our focus of effort. Low-end touch labor, sheet metal manufacturing and other more common efforts have been outsourced resulting in savings to both our commercial and military customers. **At Bell we are a leader in using Six Sigma process improvements**, lean manufacturing, global sourcing, collaborative development and joint marketing, supplier development programs and many other approaches to add value to our customers and shareholders. Our owners/shareholders expect it and our customers demand it.

#### **INDUSTRIAL BASE CONCERNS**

Market projections indicate there may be as much as \$2.5B of Homeland Security investment earmarked for rotorcraft. In today's market **50% of that will go to a foreign manufacturer**. The French government owns 20% of that manufacturer. As a taxpayer, I am outraged that on the federal, state and local level we would be spending US tax dollars to buy French helicopters for Homeland Defense. I might add too that the biggest factor in many of those buying decisions is the aggressive pricing that the French offer. A price supported by their government's partial ownership and certainly investment in technology and development.



An additional 15% of that investment goes to the Dutch company that bought MD Helicopters after the FTC failed to quickly approve Bell purchase of this product line from Boeing. **Fully 65% of the rotorcraft employed in Homeland Security are foreign.** Is that the message we want to deliver to the American people – that this country is being defended by foreign aircraft? It is highly unlikely that France would ever buy US rotorcraft for its homeland security needs.

As program development costs increase, as products become much more complex and as the size of the business bets we are taking every day continue to grow, there is an ever stronger possibility for continued consolidation.

I do not have a crystal ball and cannot predict the next major event, but in the meantime I believe that we will continue to see “creeping consolidation” at the program and product level. Almost all new products are the result of cross industry collaboration and this will continue. The Europeans are coming to America with their products: products developed with substantial government funding. They are seeking US partners to produce the products in the US and they will find them. But European products manufactured in the US do not do anything to develop or enhance our nations capability in the engineering and manufacturing technologies that are so important to sustained viability in this industry. Are we headed to a point where US manufacturers could simply be assembly subcontractors to European firms that develop and own the technology that was funded by European governments?

### **Business / Manufacturing Processes**

Bell has transformed it self over the past two years in order to remain competitive in the changing world environment. We have streamlined our processes, removing non-value-added or outdated procedures to reduce overhead and bring our costs under control while increasing our quality. We have reorganized into business units with profit and loss responsibilities and centers of excellence

where the core of our business resides. We are empowering our people and equipping our factory with modern machines and integrated planning to provide quality products at best value.

Bell and the rest of the US rotorcraft industry must have the support that only the Government can provide if it is to remain a viable part of America's economic engine and a contributor to our national defense.

**Joint Advanced Rotorcraft Technology Center of Excellence (JART COE)**

There is a pressing national need for the creation of a center of excellence that specifically deals with advanced VTOL and Rotorcraft technologies. It is exactly these kinds of past investments that have produced the breakthrough technologies that led to tiltrotor development and production that is proving America's leadership in this particular area...we must nurture and sustain this concept.

We envision this center being a Joint service (Army, Navy, Air Force, Marines and Coast Guard) and industry entity with strong leadership. This COE could do for rotorcraft what the Joint Advanced Technology (JAST) Office did for the JSF and strike/fighter technology. It should be a COE that funds continued development of advanced technologies beyond that of the 150 knot cruise speed limit of conventional helicopters. Bell Helicopter would champion this concept and fully participate.

This office would be a logical choice to fund private industry and government teams to develop, design and fly advanced proof-of-concept prototypes.

Mr. Chairman, I believe this should be seen as a national priority for the United States. I believe that this National Center of Excellence should be

quickly established and that it should be chartered and funded with a minimum of \$100 million a year for the next 5 years.

In our mind, it is time for a “go-to-the-moon-in-ten-years” national effort. The Congress, the Administration, NASA, DoD, the Department Of Transportation, the Rotorcraft Industry, the FAA, air traffic controllers and the airports come together, form a posse as we say in Texas, and ride out to solve this – while there is still time.

America can lead the way.

## **Attachment**

### **Introduction to Bell Helicopter**

Let me tell you a little about Bell Helicopter. We are a world leader in the design and manufacturing of vertical lift aircraft for customers around the world. **We are the sole US rotorcraft manufacturer with a sales and manufacturing base split equally between commercial and military customers.** We're a subsidiary of Textron, an \$11 billion multi-industry company with 49,000 employees throughout the United States and in another 40 countries.

Headquartered in Fort Worth, Texas, Bell has built 35,000 helicopters since 1946, when the Bell Model 47 became the first helicopter in the world certified for commercial use. Over the past 57 years Bell has been the leading innovator in vertical lift technology. We designed and built some 12,000 Huey helicopters...with thousands still in service performing vital roles and missions every day. We designed and built the world's first dedicated attack helicopter, the AH-1G Cobra.

**We pioneered tiltrotor technology.** From the XV-3, a single-engine piston powered tiltrotor in the 1950's, to the XV-15, a multi-engine turbine powered

tiltrotor built in 1977 (and still flying) to the V-22 Osprey, the Bell Eagle Eye tiltrotor UAV (which soon will be in service with the US Coast Guard) to the commercial BA609 being developed by Bell and its partner AgustaWestland, Bell is the world leader in this extraordinary aviation technology.

As we celebrate the 100<sup>th</sup> anniversary of the Wright Brothers' flight, we are proud to note that the Bell name has been associated with some of the most remarkable achievements in aviation over the past century. In addition to what we've achieved in vertical lift technology, I would like to point out that our parent, the Bell Aircraft Company, designed, built and flew America's first jet aircraft – the P-59 Airacomet. We also designed and built the Bell X-1 – Chuck Yeager's "Glamorous Glennis," the first plane to break the sound barrier. And we developed the first variable swing wing aircraft. Over the past half-century we have received two Collier Awards for our aerospace achievements.

Bell Helicopter operates ten plants with over three million square feet of manufacturing floor space. The company employs about 6,500 people.

With advanced technology design/engineering and high quality manufacturing, Bell aircraft are still acknowledged to be the most reliable helicopters in the world. And today, Bell commercial and military aircraft can be found flying in over 120 nations, accumulating fleet time at a rate in excess of ten flight hours every minute of the day.

In keeping with our reputation as the helicopter company most responsive to its customers, Bell has representatives in over 50 countries. In addition, Bell maintains an extensive spare parts distribution network that assures spare parts shipment to customers, military and commercial, anywhere in the world within 24 hours.

I am proud of this great industry of ours and I am proud of the achievements and contributions that we at Bell have made to aviation all these years.

### **ONGOING MILITARY PROGRAMS**

#### **The V-22 Program:**

The Bell Boeing V-22 Osprey program is Bell's largest military program with 360 aircraft going to the US Marine Corps, 50 to the Air Force Special Operations Forces and later, 48 to the US Navy. Delivery has been slowed to less than one per month until the aircraft completes certain tests that are underway that will prove its military suitability.

The V-22 has a cruise speed of over 250 knots; a payload of over 10,000 pounds or 24 fully equipped combat troops and a range of 700 -1100 nautical miles. It is designed from the bottom up as a survivable, rugged, all-weather VTOL aircraft that can operate from amphibious ships and confined areas on the battlefield. It has the unique ability to self-deploy from the US to any of the world's hot spots in less than three days.

It can provide tactical delivery capability of Marines and Special Operations Forces directly to their objective under cover of darkness deep into enemy territory avoiding the potential choke points and return safely without refueling enroute. Its sophisticated avionics suite can protect it from enemy threats and provide accurate navigational direction for surgical strikes or coordinated overmatching firepower.

The ongoing flight test programs at NAS Patuxent River and Edwards AFB are proving the viability of the V-22, and we believe it will soon become a major contributor to the US arsenal of modern weapon systems. **The V-22 has**



recently been designated as one of only four Transformational programs in DoD. This program is Bell's number one priority.

AH-1Z / UH-1Y Attack and Utility Helicopter Upgrade Program:

The Marine Corps has 180 AH-1W SuperCobra gunships and 100 UH-1N utility helicopters. The AH-1Z and UH-1Y helicopter program will upgrade those aircraft and provide a major improvement to the Marine Corps' light attack and utility warfighting capability. These aircraft have 84% commonality – by part number – to reduce the logistics and training burden, while providing a modern, advanced technology asset to improve the attack and utility mission.

The AH-1Z incorporates an integrated weapons platform that can react to modern enemy threats with pinpoint accuracy and assured destruction. Its advanced technology, unparalleled Target Sight System, enhanced situational awareness, speed and long-range weapons systems allow it to operate from long range. The AH-1Z's combat hardness and onboard defensive armament suite protects it from enemy firepower in the close-in battle.

The UH-1Y is a major improvement in capability for the light utility fleet. The payload is doubled, the range is 50% longer and its speed is 20% faster than the present utility fleet. Because this aircraft is deployed with the AH-1Z and shares so many common components, the overall procurement, training and operational costs are significantly lower than any other combination of helicopters.

Bell Eagle Eye HV-911 Tiltrotor UAV

**We are very proud to announce that the Coast Guard has selected the Bell Eagle Eye TiltRotor Unmanned Aerial Vehicle (UAV) as part of its Deepwater program. With Lockheed Martin as the architect and Bell as the UAV airframe supplier, we have a formidable team to meet the needs of the**

Coast Guard. The Coast Guard will buy 69 aircraft and 50 ground and shipboard control stations.

The Bell Eagle Eye can operate vertically from Coast Guard cutters or Air Stations, travel up to 110 miles at speeds up to 200 knots, and provide reconnaissance with a 200-pound payload package for three hours before returning to base. It can operate up to 20,000 feet to maintain line-of-sight with both its target and its base. The HV-911's simplicity, VTOL capability, high-speed cruise, and sophisticated electronic payload will vastly improve the Coast Guard's ability to provide Homeland Security both onshore and offshore. This aircraft can be depended upon to provide critical information to first responders quickly, in order to facilitate appropriate action in the event of a terrorist incident.

Bell's Eagle Eye is another transformational asset being used by a major contributor to Homeland Security -- the US Coast Guard.

Bell is actively pursuing several UAVs for the US military services. Building on our Eagle Eye experience, we are studying the Army's FCS UAV requirements, their extended range, multi-purpose program, the Comanche companion and the classified, DARPA/Army Unmanned Combat Armed Rotorcraft (UCAR) UAV program. We are providing information to both the Marine Corps and the Navy, should they determine they need a UAV with VTOL, high altitude, long range and high-speed capability.

The OH-58D Kiowa Warrior is the current armed reconnaissance workhorse of the US Army. The Safety Enhancement Program (SEP) brings all variants of this armed scout up to a single baseline configuration.

The Army's TH-67 is its initial entry helicopter flight trainer. Bell delivers both VFR and IFR versions of these aircraft to the Army Aviation Center at Fort Rucker, Alabama.

### **ONGOING COMMERCIAL PROGRAMS**

The Bell commercial helicopter product line includes both single and dual turbine engine light and medium helicopters which are capable of performing the full range of vertical lift aircraft missions, including corporate transport, emergency medical services, civil law enforcement, homeland security, and general utility. **What is unique is the synergy between commercial and military development, which has benefited both sides.**

The five-seat Bell 206B-3 JetRanger, the civilian derivative of the U.S. Army's OH-58 Kiowa scout helicopter, boasts the best single-engine safety record in the world. Its reputation for safety and reliability and for having the lowest overall operating costs in its class has made the 206B-3 the most popular turbine helicopter ever built. Today, the 206B-3, with minor modifications, is the training helicopter for all U.S. military (including Coast Guard) helicopter pilots (TH-57 & TH-67).

The Bell 206L-4 LongRanger began with all the best features of the 206B-3. To that were added a stretched cabin to accommodate seven seats and a more powerful engine. Its increased capability, coupled with safety and low operating cost characteristics similar to those of the 206B-3, provide superior value to helicopter operators around the globe.

The Bell 407 incorporates the high performance, combat proven, composite dynamic components of the U.S. Army's OH-58D Kiowa Warrior to achieve sports car-like handling and exceptional capability. This seven-seat, single-engine helicopter delivers the best speed, payload, and range in its class.

Bell further adapted and improved dynamic components of the OH-58D Kiowa Warrior and coupled them with a roomy, open, composite fuselage of modular design and powerful Pratt & Whitney PW207D engines to achieve the Bell 427.

Fast, smooth and reliable, the Bell 427 is a superior seven-seat, twin-engine helicopter that delivers.

The Bell 430 brings together superior technology and sleek aesthetics to provide the smoothest helicopter ride available in the world today. The 430's advanced rotor design is so smooth, fast, agile, and rugged, that its elements have been incorporated into the UH-1Y and AH-1Z. The eleven-seat Bell 430 epitomizes excellence in every aspect and detail.

Since its introduction, the Bell 412, the latest civilian derivative of the venerable UH-1 "Huey" military helicopter, has enjoyed unparalleled market acceptance. With its powerful twin engines, wide open cabin and durable construction; the fifteen-seat 412EP has become the rotorcraft of choice for offshore oil support operators, international militaries, emergency medical services, and law enforcement organizations worldwide, and it is the most popular medium twin-engine helicopter available.

The latest in a series of collaborative efforts between Bell Helicopter and Agusta dating back to 1952 has resulted in the formation of the Bell/Agusta Aerospace Company, bringing together the two companies' unmatched technological, marketing, sales and after sales support assets. The significant design, development and production synergies thus created are bringing to the world two new commercial aircraft, the AB139 helicopter and the BA609 tiltrotor. The latter is the world's first civil tiltrotor, a 6-9 passenger aircraft. The first BA609 has recently completed its highly successful first flight on 7 March 2003 at our Flight Research Center in Arlington, Texas. We have an exhaustive flight test program leading to certification and first deliveries of this aircraft to commercial customers beginning in the first quarter of 2007. So far we have some 66 orders with deposits for the BA609 from 42 customers in 18 countries around the globe. The Bell/Agusta joint venture is also producing a new medium twin-engine helicopter known as the AB139, which is currently in flight certification testing.

The AB139 combines the benefits of proven technology and the latest new-generation system integration. With a spacious cabin and with power to spare, the AB139 has the best vertical lift capability in the medium-twin class. The fifteen-seat AB139 is setting the new standard against which all medium-twin helicopters will be measured to satisfy the operators' needs of today and tomorrow.

#### **FUTURE MILITARY PROGRAMS**

I've told you about our current military efforts, so now let me tell you about what we at Bell are doing for the future of military rotorcraft. **Understandably, we see the future through the lens of a tiltrotor, versus a pure helicopter.** We believe that the success of the V-22 Osprey and BA609 civil tiltrotor will fuel an expansion of the industry not seen since the 1960s, when rotorcraft first truly blossomed as an industry. As those two aircraft become operational and complete missions that no other aircraft in the world can accomplish, the depth and breadth of missions that they are capable of will explode on the scene. Today the public sees tiltrotors as replacements for 32-year-old traditional helicopters. The first time an MV-22 rescues noncombatants from a burning embassy, or a CV-22 completes a heroic operation in one night, then the rest of DoD will understand the possibilities and become tiltrotor proponents. We are doing advanced concept development that will provide a smorgasbord of mission applications for DoD customers.

The Marine Corps already has this vision in that they are looking at an **All-VTOL Force** of the future. Their roadmap requires a VTOL capability for all missions currently flown by helicopters, fighters, attack and transport fixed wing aircraft. Ambitious to be sure, but then the Marines are well known for their innovative and resourceful approach to the challenges of warfare. Additionally, the Special Operations Command has asked for our input on a large tiltrotor aircraft as a possible successor to both the AC-130 Specter gunship and the MC-130 Talon.



**Let me tell you about a few of these concepts of ours.**

Building on the success of the V-22, **Bell's Heavy Lift, Quad Tiltrotor (QTR)**, has been in development since 1998. This is a 150,000 lb C-130-sized aircraft that will employ all the benefits of a tiltrotor with the load carrying capacity of a cargo plane. We have been working with DARPA on 3 consecutive contracts to reduce the risk of building a full-scale demonstrator of the QTR. DARPA has sponsored the development of an overall QTR technology roadmap, and shared the cost for hover model and wind tunnel model testing. This aircraft will be able to vertically deliver a 20-ton payload 500-1000 miles. Specifically designed for compatibility with the Army's Future Combat System (FCS), the QTR will be able to move the Army's Objective Force equipment and personnel from both strategic airfields and logistics ships directly to the battlefield. More importantly, it will not need an airfield – prepared or unprepared – to land upon. The Quad Tiltrotor will allow the Marine Corps to move its personnel and major equipment packages (up to 20-tons) from the Enhanced Naval Sea Base directly to objectives far inland. Anti-access actions by the enemy will be rendered impotent, because the QTR will bypass the beaches and seaports that may suffer from port denial and mining threats. The QTR can relieve the need to completely clear the expected shallow water mines that threaten an amphibious assault.

A Special Operations variant will provide organic firepower and refueling capability to the Special Operations Forces to increase their effectiveness in their crucial special missions. Its ability to hover makes the QTR capable of landing anywhere on the battlefield or in the urban environment to evacuate the civilian population or military forces under terrorist threat, or during natural or manmade disasters.

But we haven't stopped at heavy lift. **Other areas of concept development involve attack and escort versions of the tiltrotor for use with both the V-22 and the QTR.** These range from reaping the benefits of commonality by mating the V-22 wing and propulsion systems with a different fuselage and cockpit, which would create an attack tiltrotor with A-10 characteristics, to developing a

completely new design for a stealthy attack/escort tiltrotor. **A more radical design that has already seen some wind-tunnel time is our Stop-Fold TiltRotor (SFTR) concept vehicle.** If a tiltrotor combines the best characteristics of a helicopter and a turboprop, this aircraft will combine the best aspects of a tiltrotor and a jet. The SFTR's unique design allows it to take-off and land like either a helicopter or a turbofan jet. At low speeds (up to 150 knots), it operates like a conventional tiltrotor, but above that speed its rotors can be feathered, stopped, and folded along the nacelles, and the turbofans will convert from shaft drive to thrust – giving the aircraft a speed range of zero to its power limit. High subsonic, or even supersonic speeds are possible with this design. The SFTR provides jet performance while “up and away” with the easy maneuverability, reasonable downwash and hover efficiency of a tiltrotor during the takeoff and landing portion of flight. Now that will be one heck of an aircraft.

### **Civil Applications**

**The beauty of tiltrotors is that they are equally beneficial in the commercial market.** Civil tiltrotors are being certified as we speak. The previously mentioned BA609 has just completed its history-making first flight for a passenger-carrying commercial tiltrotor. This aircraft combines the speed, altitude and comfort of a turboprop with the vertical takeoff and landing capabilities of a helicopter. Twice as fast as helicopters of similar capacity, the BA609 tiltrotor's unique capabilities and performance characteristics promise to make it one of the most useful and versatile aircraft in aviation history. We expect it to be a best seller in the near term civilian marketplace.

With the Marines and Air Force, we are looking at military missions it may fill in the future, such as an initial entry trainer for both MV and CV-22 pilots at flight school.

### **Use of civil TiltRotors in the nation's transportation system**

Everyone has suffered through delays, cancellations and the general aggravation that comes with the state of congestion in our country's airports. And while

Congress and the Department of Transportation hold hearings and commissions study and muse over the problem, the answer has been available for nearly two decades. The revolution that rides the Tiltrotor technology of the V-22 offers the United States the opportunity to alleviate a good deal of that congestion with a ***Runway Independent Tiltrotor Aircraft***.

Air traffic is now projected to increase at about 6% per year for the foreseeable future. At this compounded rate, we will see twice as many people traveling in the next ten years as we do today.

Although 9/11 slowed the air traffic in this country, the expectation is that congestion will return in the near future. In the two years before the terrorist attacks in New York and Washington, DC we had seen almost total gridlock in our skies, especially during the summer months. Not a week went by without a major news story reporting on "Our Crowded Skies."

A July 2002 report entitled "The National Economic Impact of Civil Aviation" by DRI-WEFA showed that in the year 2000 alone, **congestion cost this country \$9.4B**, and even if all presently planned improvements to air traffic are incorporated on schedule, the cost is expected to grow to \$11+ Billion per year by 2012 in *constant year dollars*! Over that 12-year period a total of \$156.7 Billion will be lost to the US economy due to congestion in the nation's air traffic system.

When weather and visibility reduction conditions hit, the planes begin to back up. In short order, airplane-landing rates stretch out. Each delay pushes the next airplane even later. After a short time aircraft are backed up in the stack awaiting landing instructions. These landing delays eventually cause the air traffic controllers to begin holding aircraft on the ground at their take-off points. Aircraft begin to be held on taxiways and at the gates. Then gate departures are delayed

and people wind up sitting at the airport until their turn comes to enter the daisy chain.

Most of the time today, in clear weather, the airlines and airports can handle the number of take-offs and landings they have scheduled each day. But if a weather delay or some other event slows down the system somewhere, there is almost no elasticity in that system to take up the slack, and a total slowdown is unavoidable. To help the airlines show a better "on time" record, they have begun to add 10-20 minutes to their scheduled trip times to provide a buffer.

For flights less than 600 miles, due to air traffic, routing, queuing and ground taxi time, the **average published speed from gate-to-gate of a 550 MPH airliner drops to less than 300 knots**; and the shorter the trip, the slower the average speed. We are aware of at least one route in the United States where the average speed is less than the stall speed of the aircraft!

With a projected doubling of the nation's air travelers over the next ten years, the problems we now see caused solely by weather will become commonplace events -- even in good weather. All the time, every business-commuting day, at least five days a week, we will be seeing a slow down. The Department of Transportation wants to increase the number of airports, or add more runways to existing airports, or increase the size of the airplanes. But these ideas are falling on deaf ears because of environmental concerns.

Airbus is looking at 550 to 600 passenger airliners. While that may sound great -- using one big jet to fly everybody to New York at the same time -- past experience shows that most air travelers -- especially business travelers -- consider scheduling flexibility to be extremely important. DFW is trying to add an eighth runway to its airport, and Chicago O'Hare has major community noise abatement issues today that cost it over \$300 million per year. This drives up landing fees and thus ticket prices.

While the solutions above seem on the surface to be reasonable, public opposition appears strong enough to slow down – or even halt – the process.

The big aircraft will help the long haul, hub-to-hub market. But they *will not* help the high frequency, short haul markets, which comprise the majority of the airport movements at most congested airports.

**Bell has an ongoing study that is beginning to show some very interesting information.** When you look at the major hub airports across America, and in Japan and Europe, you find that the majority of the flights passing through these airports are not going very far. For example, at DFW, an airport most of us would consider a long haul airport, over 40% of the flights go less than 600 statute miles! At Chicago O'Hare, another long haul airport, the number is an amazing 65%. **But it's when you start marching up the Eastern Seaboard that the numbers are staggering.** Washington Reagan comes in at 80%, and at Newark we find that *fully* 90% of its flights go less than 600 miles!

**If there were a way to remove these short haul aircraft from the traffic patterns and allow them to approach and depart the airport without impacting the longer haul aircraft, clearly many slots would open up. Traffic could be increased, and most of today's major airports could handle their projected capacity needs well into the next decades.**

We at Bell believe *there is a way* – by applying the technologies exemplified by the V-22, the Bell Agusta 609 civil Tiltrotor and the Quad Tiltrotor. Tiltrotor Aircraft can be built with passenger capacity from 10 to over 100 seats. These Tiltrotors, as you will hear later, can simultaneously land and take-off from the major airports without impacting the normal, daily airline traffic. The Tiltrotor's ability to fly like an airplane, yet approach, land, and takeoff like a helicopter will



allow it to safely operate independent of the runways, thus moving more passengers per hour through the airport.

We envision the Tiltrotor would land and take-off from existing unused portions of the airports. A concrete pad measuring 100 X 1500 feet, or a short stub runway is all it would need for Category A operations. Better yet, the civil Tiltrotor can penetrate the populated airspace surrounding the airport in its quiet, airplane mode, convert to helicopter mode over the airport property, and make a gentle 50-knot helicopter descent and landing. Takeoffs can be made from the same location with safe helicopter-like steep departures that still allow conversion to airplane mode for cruise – **achieving a quiet takeoff before leaving airport airspace.**

This concept of operations can keep the noise COMPLETELY over the airport property!

The Tiltrotor can both increase the capacity of the air traffic systems around the world and help to reduce the environmental impact of noise pollution. This low noise capability may even allow existing General Aviation airports that have been closed to scheduled air service because of noise to be reopened, allowing air transportation access to return to many regions of the country that have lost it in the past. The positive economic impact to those areas can only be imagined.

**It will take time to develop and produce these aircraft, but it sounds like time is not on our side. For many years now people have talked about the coming gridlock in the air traffic system – but it always seemed to be somewhere in the future. Well the future is here.**

I think because we see a steady growth in air traffic requirements we have been lulled into thinking the problems would get worse at the same pace, and we would eventually find a way to solve them.

We need to take a lesson from our compatriots on the groundside of transportation. The interstate highway studies have found that when freeway traffic is moving along at 65 miles per hour, all cars and drivers have a comfort zone, and the flow is continuous and steady. There is some point, however, where the number of cars reaches a saturation point. All cars are still moving at 65 and all seems well. But if you introduce only 5% more cars onto that freeway, then the average speed will slow all the way to 30 miles per hour.

If 10% more vehicles are allowed to join the flow of traffic... it stops! The comfort zones have all been violated and cars begin switching lanes, people slow down and, what seemed like a nice drive turns into a nightmarish gridlock. We believe that this is what happened to the air traffic system for the past two summers before 9/11. The air traffic was flowing along at or near saturation for clear weather, then, when the weather delays hit, everything grinds to a stop. There is no scenario that we see that will lessen this inevitability as air traffic demand continues to increase.

Something must be done quickly or we will find that all of us – the airlines, the airports, the traveling public, the package express companies, and air commerce in general will slow to a crawl. We believe that introduction of VTOL aircraft in general and Tiltrotors in particular, can alleviate this potential threat, and can do so for many years to come

It is expected that the costs of Tiltrotor operations will be somewhat higher than airline operations when only comparing the aircraft to each other, but when the costs of delays, congestion, new airports and runways and noise abatement is included this new system can be quite competitive.

In addition, countries like Brazil, China and Russia with their large land masses, dispersed population and poor infrastructure can import Tiltrotors to not only improve their transportation and economy, but provide major business relationships which can aid our efforts to neutralize terror organizations and make the world a safer place for commerce and industry. Ultimately, the quality of life on the entire planet can be improved.

### **Commercial Helicopter Improvements**

Many of Bell's commercial products are being challenged in the marketplace by newer designs offered primarily by our chief competitor from Europe, the French-based Eurocopter. Bell is investigating technology required to develop a breakthrough family of helicopters primarily for the commercial market, but which could also serve the U.S. Armed Forces. Technology gaps that we are exploring include rotor systems that can fly at significantly higher cruise speeds than current aircraft with exceptional ride and handling qualities; noise control technologies providing outstanding community noise abatement and a conversation-quiet interior; airline levels of reliability; and low manufacturing cost. These will provide improved returns to Bell and low operating costs for our customers. Additionally, we are encouraging our engine suppliers to develop engines for this family of aircraft that provide significant reduction in fuel consumption and operating costs. These are the kinds of investments that provide technology leadership for our company and our nation.

### **SUMMARY**

Advanced helicopters and tiltrotors will be used in all sizes and shapes by both civil and military aviation in the future, and that is why we are so optimistic about the VTOL business. But a reasonable level of government support must underwrite our optimism. **We need your help. Our industry needs to be supported by a significant level of investment from NASA and by military S&T and R&D, to bring advanced rotorcraft technologies to maturity. Rotorcraft investment should at least equal the support given to fixed-wing**

development. We need the Joint Advanced Rotorcraft Technology Center Of Excellence to be established. We need higher production rates, increased production quantities, and a commitment to multiyear procurement. We need DoD, NASA and/or DARPA funding for private industry initiatives to develop, design and fly proof-of-concept advanced prototypes. This VTOL need is in its infancy. As the mission requirements grow, so will the need. Bell intends to be at the forefront of this rotorcraft revolution, and we will do everything in our power to ensure American dominance and pre-eminence. **But it needs to be a government / industry partnership that shares both risk and reward.** We are a uniquely American industry, and Bell is a uniquely American company. **We need your help because it's good for America.** Thank you for your time and for giving me this opportunity to discuss the challenges and the opportunities of the American rotorcraft industry. I look forward to any questions you may have.

John Murphey  
Chairman and CEO  
Bell Helicopter  
A Textron Company



**John R. Murphey**  
**Chairman and**  
**Chief Executive Officer**



John R. Murphey was named the Chairman and Chief Executive Officer of Bell Helicopter, a Textron Company, effective September 26, 2001. He had been the President of Bell Helicopter since November 1, 1998, and was named Chief Operating Officer in March of 2001.

Mr. Murphey, an aerospace executive with over 40 years of industry experience, joined Bell in 1961, and has held a wide variety of positions within the company. These include key positions in Materiel, Procurement, Program Management, Commercial Sales & Marketing, Product Support, Military Business, and Operations Management.

From April 1994 to August 1996, Mr. Murphey was the Executive Vice President of Manufacturing Operations and Engineering for Textron's Aerostructures Division located in Nashville, Tennessee.

Mr. Murphey is a graduate of Texas Wesleyan University and completed his MBA in 1973 at Texas Christian University. He also attended advanced management courses at Harvard and Duke Universities.

John was in the U. S. Army from 1966 to 1968 and served in Vietnam with the infantry. A native Texan, Mr. Murphey and his wife Kathy reside in Fort Worth.

Trustee: Texas Wesleyan University

Advisory Board Chairman: Tarrant County Salvation Army

Past Chairman: AHS International (American Helicopter Society)

Board Member: Fort Worth Chamber of Commerce

Board Member: Business Council for International Understanding (BCIU)

<http://www.bellhelicopter.textron.com>

Bell Helicopter Textron Inc. Post Office Box 482, Fort Worth, TX 76101

03/03



**Statement of Roger Krone  
Senior Vice President  
Boeing Army Systems**

**Before the**

**Subcommittee on Tactical Air and Land Forces  
Committee on Armed Services  
U.S. House of Representatives**

**ON THE UNITED STATES' ROTORCRAFT PROGRAMS**

**FIRST SESSION, 108<sup>TH</sup> CONGRESS**

**MARCH 12, 2003**

**NOT FOR PUBLICATION  
UNTIL RELEASED BY THE  
COMMITTEE ON ARMED SERVICES**

Thank you, Mr. Chairman and members of the committee. My name is Roger Krone, and I am Senior Vice President of Army Systems, a unit of Boeing Integrated Defense Systems. I appreciate this opportunity to share with you Boeing Army Systems' perspective on the current state of the rotorcraft industry and the prospects for the future.

I would like to talk about what we are doing at Boeing with regards to research, development, design and production in the area of rotorcraft, as well as emerging requirements and the investments that need to be made to take rotorcraft to the next level and beyond.

Boeing Army Systems is a growing \$2 billion business which encompasses systems integration work on several major U.S. Army transformational programs, including Future Combat Systems and Joint Tactical Radio Systems. Our core business also includes our rotorcraft activities centered at our facilities in Philadelphia, PA and Mesa, AZ where we employ nearly 10,000 skilled and talented people. In addition, we support a widespread supplier base in more than 43 states. Both these sites enjoy a rich heritage of rotorcraft production that spans more than half a century. They draw on a legacy of innovation that includes rotorcraft pioneers such as Howard Hughes and Frank Piasecki.

As you know, Mr. Chairman, the business that Frank Piasecki started in a suburban Philadelphia garage has grown into a rotorcraft production facility that occupies 3.26 million square feet and employs approximately 4,400 people. This facility includes a world-renowned, 20 X 20 ft. low-speed wind tunnel, two fully instrumented whirl towers, a state-of-the-art simulation facility, and world-class composite manufacturing capabilities.

At this site, we manufacture and support the CH-47 Chinook, which entered service in the early 1960s. More than 800 of these twin-engine, tandem-rotor heavy lift helicopters are in service with the U.S. military and international customers. The Chinook possesses an unparalleled capability to support the full

spectrum of military, humanitarian relief, and nation-building missions around the globe.

We are currently remanufacturing U.S. Army Chinooks to the new F-model configuration and MH-47G Special Operations Chinooks under the second modernization program in the history of these helicopters. This program will increase the capabilities and extend the service life of the CH-47 well beyond 2020. The first Chinook aircraft to be updated have been received from the fleet. They have been inducted into the modernization program and are progressing on schedule.

We are also modernizing Chinooks for international customers. There are approximately 300 Chinooks in service in more than a dozen countries around the world. In addition, we have sold, and will continue to offer, new-build Chinooks to international customers.

Our Philadelphia facility also is the location for our activities on the RAH-66 Comanche armed reconnaissance helicopter. We're developing the Comanche in cooperation with our teammate Sikorsky Aircraft.

The twin-turbine, two-seat Comanche is the centerpiece of the U.S. Army's aviation modernization plan and reflects the Army's overall transition to an Objective Force. This force will utilize advanced weapon systems and smaller units that are responsive, deployable, agile, versatile, lethal, survivable, and sustainable. The Comanche, with its advanced sensor and integrated communications suite, represents an essential reconnaissance node in the Army's network centric warfare architecture.

Philadelphia also is the center for Boeing's work on the V-22 Osprey tiltrotor aircraft which is currently in low-rate production. Boeing is partnered with teammate Bell Helicopter Textron on this program.

The V-22 Osprey is the first aircraft designed from the ground up to meet Marine Corps, Navy, and Air Force Special Operations requirements. With the speed and range of a turboprop and the vertical lift of a helicopter, the V-22 offers unmatched flexibility for the 21<sup>st</sup> Century warfighter. The aircraft can transport Marine Corps assault troops and cargo using its medium lift and vertical takeoff and landing capabilities. It meets U.S. Navy requirements for combat search and rescue, fleet logistics support, and special warfare support.

The twin-engine tiltrotor can carry 24 combat troops, or up to 20,000 pounds of internal or external cargo, at twice the speed of a helicopter. It includes cross-coupled transmissions so either engine can power the rotors if one engine fails. The rotors can fold and the wings rotate so the aircraft can be stored aboard an aircraft carrier.

At our Mesa facility, where we have more than 4,100 employees, the focus is on manufacturing and modernizing AH-64 attack helicopters for the U.S. Army and international customers, as well as developing new technologies for the defense industry. Mesa is the center of lean manufacturing within Boeing Army Systems. The site also is the center of excellence for flight test. In addition, it has numerous component and vehicle test facilities and hosts a world-class man-in-the-loop developmental simulation facility.

Boeing has delivered more than 1,000 Apaches to customers around the world since the first aircraft rolled off the assembly line in 1983. A total of 11 nations worldwide have selected the Apache for their defense forces. The AH-64D Apache Longbow is the latest version of the combat-proven Apache. The Apache Longbow's fire control radar and advanced avionics suite give combat pilots the ability to rapidly detect, classify, prioritize, and engage stationary or moving enemy targets at standoff ranges.

Production of the "D" model began in 1996 under a multi-year contract with the U.S. Army based on a block modernization concept. The contract involved remanufacturing 232 AH-64A Apaches to the Apache Longbow configuration, and the first aircraft were delivered to the U.S. Army in 1997. To date, the Army has fielded seven fully equipped, combat-certified Apache Longbow battalions.

Under a second, five-year contract with the U.S. Army, Boeing will convert an additional 269 AH-64As into Apache Longbows through 2006. Under the two contracts, Boeing will remanufacture a total of 501 Apache aircraft out of a total of nearly 750.

Last month, the first Multi-Year II, Block II configuration Apache Longbow was delivered to the U.S. Army. Block II incorporates the latest advances in databus technology, communications, a digital map, and other upgrades to facilitate improved situational awareness. The integration of new technologies continues to enhance the AH-64D Apache Longbow's position as a critical asset for the U.S. Army. Recent decisions have placed the Apache Longbow in the Army's Objective Force for future combat operations.

Future upgrades – many of which are being proposed in a new Block III configuration – are essential for U.S. Army Apaches to retain their leading edge and provide the best possible protection for the men and women in our armed services. The proposed Block III Apache will be a critical element in the Army's network centric architecture.

Block III remains unfunded, and that poses a significant issue for the industrial base for Apache, as well as other technologies being developed in Mesa. Without funding for Block III enhancements the rotorcraft industrial base will be adversely affected in Mesa.

We are also continuing to investigate advanced systems, both manned and unmanned, and new technologies to support the U.S. military's transformation. Boeing is currently conducting concept development studies for an Unmanned



Combat Armed Rotorcraft, or UCAR. This U.S. Army/Defense Advanced Research Projects Agency program seeks to develop an autonomous, survivable and lethal unmanned rotorcraft for the Army's Objective Force. Boeing is a Phase One contractor and is currently in competition for a Phase Two award.

We're also working on a revolutionary design concept called the Canard Rotor/Wing (CRW) that can perform like a helicopter for vertical takeoffs and landings and as a fixed-wing aircraft for high-speed cruise. For rotary wing flight, the CRW's reaction-drive rotor/wing eliminates the need for a mechanical drive train and anti-torque system. That equates to reduced weight, cost and complexity. An unmanned version of the CRW could perform a variety of missions, including communications and data relay, reconnaissance, and logistics resupply. Manned versions could also perform these same functions, as well as civilian security operations.

These and other manned and unmanned rotorcraft technology developments offer further opportunities to meet Department of Defense and Homeland Security requirements and could play a significant role in maintaining the rotorcraft industrial base.

But the critical question is whether we can deliver on the promise of these and other new advanced rotorcraft concepts. Looking at the track record so far, the odds would seem to be less than favorable. For several years, the focus has been largely on extending the life of existing platforms rather than the development and production of new-build aircraft. It's been on incremental, evolutionary improvements rather than innovative, revolutionary new designs.

The last new helicopter development contract from the Department of Defense was awarded in 1991 for the Comanche. That represents a gap of 12 years. In fact, our most recent hope, the Joint Transport Rotorcraft program, has disappeared from long-range budget plans altogether.

While we obviously are concerned about the health of current rotorcraft programs, we're even more concerned about the future and where the industry as a whole will be in ten, twenty or thirty years' time. Will the technology be there when we need it? Will the infrastructure be there? Will we have the people in place with the right skills to deliver the new products we'll need in the future? And will there be a robust supplier base to support the industry?

Some of us here can recall the futuristic stories of the 1950s that forecasted the vast potential for rotorcraft. Many of those stories predicted we'd all have a helicopter in our garage and we'd be using them to fly between neighboring cities. Well, last night I looked in my garage, and there wasn't a helicopter there. Every family *doesn't* have one. More than 50 years later the vision has yet to materialize. There is no mass-market rotorcraft consumer base.

The much-anticipated commercialization of rotorcraft never occurred as some of the visionary pioneers in the industry expected, and without the investment that a large commercial market can bring to bear, the industry has largely been dependent on government customers to help defray the costs of advancing technology and developing new products. Compared to the U.S., European governments have performed this role better, resulting in a sustained competitive advantage for European commercial helicopters in the marketplace. Indeed, after losing money for ten years, Boeing exited the commercial rotorcraft market in 1998, for just these reasons.

As we've seen, the military rotorcraft market has largely evolved from buying new aircraft to upgrades and remanufactures of fielded platforms. The time between new products is getting longer and longer. Industry has often been forced to rely on international sales to bridge gaps between U.S. military programs in order to keep production lines warm and retain our skilled work forces.

But this is becoming more and more difficult as a result of increasingly aggressive challenges from our European competitors in markets around the world. These competitors, bolstered by increasing government support for research and development of military as well as civil rotorcraft, are offering new products, incorporating technological advances in areas such as rotor blades and transmissions that match or sometimes exceed U.S. capabilities.

Five years ago, an \$800 million program was created to provide new rotor technologies, such as on-blade control, swashplateless design and higher harmonic control. This Variable Geometry Advanced Rotor Design (VGARD) program would have set the foundation for the next generation of jet-smooth helicopter flight. VGARD was subsequently cancelled as a direct result of budget cuts. Along with this, came a diminished industrial base of key technology providers and development facilities, such as wind tunnels and simulators. Unfortunately, these losses will be hard to recover, if they ever can be recovered at all.

Rotorcraft technology is a national asset. We've seen how helicopters have contributed to the defense of the nation and enriched our lives. Anyone who watches CNN knows how effective they have been in conflicts around the globe and in humanitarian missions.

Apaches, Chinooks, and other rotorcraft have played central roles supporting national security interests, serving with distinction in a number of recent military and peacekeeping operations, including Afghanistan. Chinooks have proved their worth over and over again in humanitarian and disaster relief missions. In recent years, they have helped people recover from flood damage along the Mississippi River, transported food and essential supplies into Dade County in the wake of Hurricane Andrew, and assisted in the rescue of Pennsylvania coal miners trapped by underground flooding.

Yet the U.S. Army is relying on a heavy lift platform designed more than 40 years ago to transport troops and equipment on the battlefield. The Chinook was developed in the late 1950s, less than a decade after the B-52 bomber entered service. Since then, two follow-on bombers have been fielded, but no new heavy-lift helicopter. More has been spent on the F-22 fighter program alone than on rotorcraft development over the last 30 years.

The question is: "How long can we continue down this path?"

There are many emerging requirements for rotorcraft. The impact of reduced federal funding for rotorcraft science and technology efforts has delayed the accomplishment of national priorities in several vital areas:

- Advanced rotorcraft systems to support mobility requirements for the Army's Objective Force... There has been a long-standing joint, multi-service requirement for a VTOL heavy cargo lifter. All the military services agree on the need, but a lack of funding has delayed the development of key enabling technologies.
- Emerging Homeland Security applications... There is an urgent need for an all-weather, rapid response capability in low-visibility and obstacle-rich urban environments that cannot be met adequately with current-technology rotorcraft.
- Transportation... An important element of long-term congestion relief is to transport short-haul passengers to and from airports in runway-independent aircraft, freeing the runways (and the air traffic control system) for use by long-haul aircraft.

Will we be able to meet these requirements? I believe we have little choice.

Increased collaboration on research and development offers a step in the right direction. But without the right investments now, rotorcraft will not be able to fulfill the roles envisioned for them in the future. Industry and government must work together to ensure continued development of the best of rotorcraft technology to meet the ever-growing needs of our nation, as well as sustain the competitiveness of the U.S. rotorcraft industry in the international marketplace.

Thank you, Mr. Chairman.



**DISCLOSURE FORM FOR WITNESSES CONCERNING FEDERAL  
CONTRACT AND GRANT INFORMATION**

**Witness Name:** Roger Krone

**Capacity in which appearing:** Representative of the Boeing Company, Integrated Defense Systems, Army Systems business Unit. The following is a summary of major Federal Contracts awarded to Boeing for rotorcraft and related products and services in the past three years.

<b>Federal Contracts</b>	<b>Federal Agency</b>	<b>Dollar Value (approximately)</b>	<b>Subject / Description</b>
AH-64D Apache Longbow (Including Foreign Military Sales)	U.S. Army	CY 2003 \$ 81M CY 2002 \$554M CY 2001 \$524M	The AH-64D Apache Longbow is the most lethal, survivable, deployable and maintainable multi-mission combat helicopter in the world.
CH-47 Chinook (Including Foreign Military Sales)	U.S. Army	CY 2003 \$ 245M CY 2002 \$356M CY 2001 \$284M	The CH-47 Chinook is the world's most reliable and efficient heavy-lift helicopter, operable in both military and civil missions.
RAH-66 Comanche	U.S. Army	CY 2003 \$0 CY 2002 \$ 3.25B CY 2001 \$180M	The Boeing-Sikorsky team is developing the RAH-66 Comanche, a twin-turbine, two-seat, armed reconnaissance helicopter slated to enter service with the U.S. Army in 2006.
V-22 Osprey	U.S. Navy	CY 2003 \$30M Cy 2002 \$687M CY 2001 \$482	In partnership with Bell Helicopter Textron, Boeing developed the revolutionary V-22 Osprey tiltrotor aircraft. Combining the speed and range of a turboprop and the vertical lift of a helicopter, the V-22 can carry up to 24 troops or 20,000 pounds of cargo at twice helicopter speeds.

**Federal Contract Information:**

Number of contracts (including subcontracts) with the Federal Government:

Current Fiscal Year (2003):	79
FY 2002	>120
FY 2001	>150

**Federal Agencies with which Federal Contracts held:**

Dept. of Defense, NASA, FAA

**List of subjects of Federal Contracts:**

Rotorcraft and rotorcraft related research, products and services.

**Aggregate dollar value of contracts held:**

**(Rotorcraft and related products and services backlog only):**

FY 2003	\$5.9B
FY 2002	\$7.4B
FY 2001	\$7.3B

**ROGER A. KRONE**  
**Senior Vice President**  
**Army Systems**

Roger A. Krone is senior vice president of Army Systems, a unit of Boeing Integrated Defense Systems, and a member of the Boeing Executive Council.

Boeing Integrated Defense Systems (IDS), based in St. Louis, is a \$23-billion business with capabilities in defense, intelligence, communications and space. Boeing Integrated Defense Systems is a recognized leader in providing end-to-end services for large-scale systems that combine sophisticated communications networks with air, land, sea and space-based platforms for global military, government and commercial customers.

Krone leads a growing \$2 billion business that includes the major transformational Army programs Boeing won in 2002 – Future Combat Systems and Joint Tactical Radio Systems.

In addition to systems integration work for the Army, this business unit also delivers many Army platforms, including the RAH-66 Comanche combat helicopter, the AH-64D Apache Longbow and the CH-47 Chinook tandem rotor helicopter. Headquartered in Delaware County, PA, Army Systems employs more than 8,000 men and women.

Until September 2002, Krone was vice president of strategic programs at Boeing's corporate headquarters in Chicago. He was previously vice president and general manager for U.S. Army Programs and Military Rotorcraft for The Boeing Company where he had overall responsibility for all U.S. Army programs and supporting functional activities in Philadelphia and Mesa, Ariz.

Programs at these facilities include the Bell Boeing V-22 Osprey tiltrotor, the Boeing Sikorsky RAH-66 Comanche combat helicopter, the CH-47 Chinook and CH-46 tandem rotor helicopters, the AH-64D Apache Attack helicopter and the Boeing Strategic Manufacturing Center (SMC) for wiring.

Prior to this assignment he was the vice president and general manager of Business Management and chief financial officer for Boeing Military Aircraft and Missile Systems. He was responsible for all financial activities of the unit and led the team that manages business resources.

Roger Krone also served as vice president and treasurer of McDonnell Douglas, responsible for financial planning, treasury operations, investor relations, insurance and risk management and pension fund management.

He joined McDonnell Douglas in 1992 as director of Financial Planning and later became division director of Information Systems at McDonnell Douglas

Aerospace. He was with General Dynamics from 1977 through 1991, where he held positions in program management, engineering and finance.

Krone is a graduate of Georgia Institute of Technology, with a bachelor's degree in aerospace engineering. He received a master's degree in aerospace engineering from the University of Texas at Arlington and a master's degree in business administration from the Harvard Graduate School of Business. Krone is also a certified public accountant.

He is a member of the Association of the United States Army (AUSA) and on the board of directors for the Greater Philadelphia Chamber of Commerce, The Franklin Institute Science Center, the Army Aviation Association of America (AAAA), the Electronic Industries Alliance (EIA) Board of Governors and past Chairman of the American Helicopter Society (AHS). He is also a commercial pilot.

Krone was born July 25, 1956, in Cincinnati, Ohio.

**Boeing Rotorcraft Programs**



**AH-64 Apache**

Defense forces worldwide fly two variants of the AH-64 Apache multi-mission combat helicopters: the AH-64A Apache and the next-generation version, the AH-64D. Equipped with radar, the aircraft is known as the AH-64D Apache Longbow. Without radar, it is the AH-64D Apache. (In the United Kingdom, where all next-generation Apaches will have radars, Apaches in production by AgustaWestland, are designated WAH-64 Apaches.)

## **AH-64D Apache Longbow**

The AH-64D Apache Longbow is the newest version of the combat-proven AH-64A Apache and a candidate to fulfill the attack helicopter and reconnaissance requirements of numerous armed forces worldwide. Apache Longbow is in production at The Boeing Company in Mesa, Ariz.

Boeing is producing the world's most advanced multi-role combat helicopter for the U.S. Army at a rate of six helicopters a month. The rate does not include ongoing production of new aircraft for the United Kingdom (in support of prime contractor AgustaWestland), plus pending new or remanufactured aircraft for Singapore, Egypt, Japan, Israel, Kuwait and other future international customers.

More than 1,100 AH-64A and AH-64D Apaches have been delivered to customers around the world since the Apache went into production in the early 1980s. Boeing has announced a commitment to deliver 1,000 more Apaches over the next decade.

The program received a major boost in October 2000 when the U.S. Army raised its total Apache Longbow orders to 501 with a second five-year, multi-year contract with Boeing for 269 additional remanufactured Apache Longbows.

The final aircraft for the first multi-year Apache Longbow contract and the first Apache Longbow for the follow-on program were rolled out for the Army in April 2002.

U.S. Army Apache Longbow production at The Boeing Company in Mesa, Ariz., will continue through at least 2006.

These multi-year contracts are saving millions of dollars by giving the U.S. Army more aircraft than would be available under single-year funding over the same period.

The venerable Apache has accumulated more than 1.5 million flight hours since the first prototype aircraft flew for the first time in 1975.

## **Fielding Efforts Continue**

Seven U.S. Army Apache Longbow battalions have been certified as combat ready. The sixth unit was certified in June 2002.

Three of the seven units have deployed Apache Longbows overseas. In early 2002, Apache Longbows were sent to the Middle East to participate in the Operation Desert Spring training exercise. In late 2001, the U.S. Army deployed

an Apache Longbow battalion to the Republic of Korea. In July 2002, the U.S. Army deployed an Apache Longbow battalion to Germany.

The first fully equipped U.S. Army unit with AH-64D Apache Longbows was fielded in November 1998. The Army fielded its first international Apache Longbow unit in October 2001. Additional combat units are in training.

The first Apache Longbow unit also became the first to field the Interactive Electronic Technical Manual, a revolutionary Class IV computerized data storage system that enables multiple fault troubleshooting, configuration management, and eliminates the need for paper technical manuals.

The first six production Apache Longbows were flown to Fort Hood, Texas, in April 1998, aboard a C-5 transport aircraft as a demonstration of the U.S. Army's ability to rapidly deploy large numbers of Apache Longbows. The U.S. Army unveiled the Apache Longbows to the public in June 1998, during a formal arrival ceremony at Fort Hood.

### **U.S. Army National Guard and Reserve**

Seven Army National Guard and two Army Reserve units in North and South Carolina, Florida, Texas, Arizona, Utah and Idaho that fly AH-64A Apache helicopters are considering converting their AH-64A Apaches to the more advanced AH-64D Longbow configuration.

According to the National Guard's 2002 Posture Statement, "The Army National Guard plays an increasingly significant role in the National Military Strategy, now missioned even more closely with Active Component forces. The Guard must modernize at an accelerated rate."

The National Guard and Army Reserve routinely deploy their Apache resources in support of regional and international operations. The Pennsylvania National Guard is scheduled to receive Apaches in 2003.

### **Roadmap for the Future**

Boeing is working closely with the U.S. Army and its international customers to ensure the continued superiority of the Apache Longbow.

Planned enhancements include a Modernized Target Acquisition Designation Sight/ Pilot Night Vision Sensor, further enhancements to the Improved Data Modern, advanced non-line-of-sight communications, and a full digital map.

U.S. Army Apache Longbow aircraft demonstrated the aircraft's advanced capabilities in April 2001 during the Army's Division Capstone Exercise at Fort Irwin, California. During the field test, 16 Apache Longbows participated in the

division-level exercise that evaluated the 21st century capabilities of the Army's warfighting systems.

AH-64D Apache Longbows have greater weapons accuracy at longer ranges and have the ability to fight more effectively at night and in nearly any weather.

The Apache Longbow's advanced communications and combat capabilities give battlefield commanders the ability to effectively manage 21st century conflict arenas in real-time.

On reconnaissance missions, Apache Longbow detects objects of interest without being detected and digitally sends images and precise target locations to other air and ground stations.

The Apache Longbow's fully integrated suite of multi-spectral sensors and digital communications provides real time situational awareness. Communication lets members know exactly where they are, where their friends are and where the aggressor is.

Apache Longbow is being continually improved to ensure relevance for operators around the world. The Apache is designed to effectively assimilate technological enhancements. Similar advancements will take place throughout the life of the aircraft.

The U.S. Army has established programs designed to keep its Apaches at the leading edge of technology for the next 30-plus years.

Continuously expanding digital communications capabilities increase the number of on- and off-board sensors/systems that enable the Apache to exchange real-time information.

Apache's digital connectivity, powerful new sensors, individual weapon systems, advanced training devices and maintenance support systems are all designed in anticipation of growth and changing requirements.

Such improvements ensure full mission capability during active duty and reduced operating costs in peacetime.



**CH-47D/F Chinook**

The Boeing CH-47 Chinook is a twin-turbine, tandem-rotor, heavy-lift transport helicopter. Boeing manufactures, modernizes and supports the Chinook in Philadelphia for the United States Army, Army Reserve, National Guard and several international customers.



The Chinook's principal U.S. Army mission is movement of troops, artillery, ammunition, fuel, water, barrier materials, supplies and equipment on the battlefield. Secondary missions include medical evacuation, aircraft recovery, fire fighting, parachute drops, heavy construction, civil development, disaster relief and search and rescue. In the U.S. Army National Guard and among international customers, Chinooks often devote most of their flight hours on these secondary missions.

The U.S. Army has operated a variety of CH-47 Chinook models since first taking delivery in 1962. Shortly after entering Army service, Chinooks were deployed to the Republic of Vietnam, where CH-47A, B and C models served with distinction for a decade until the war's end in 1975. Of the nearly 750 Chinooks in the U.S. and Republic of Vietnam fleets, about 200 were lost in combat or wartime operational accidents.

After the war, Boeing and the Army began planning a major fleet upgrade that led to development of the CH-47D. Almost 500 early model Chinooks went through an extensive modernization process in Philadelphia that produced an essential new CH-47 fleet. Boeing completed first D-model deliveries in 1982 and concluded the program in 1994. Only two U.S. Army CH-47Ds were built to replace aircraft losses in the Persian Gulf War. All other D models are modernized aircraft.

The CH-47D remains the U.S. Army standard and features composite rotor blades, an improved electrical system, modularized hydraulics, triple cargo hooks, avionics and communication improvements and more powerful engines that can handle a 25,000-pound useful load, nearly twice the Chinook's original lift capacity. The CH-47D Chinook already has been the U.S. Army's prime mover for 20 years, and was a central element in U.S. Army operations in the Persian Gulf War, where more than 160 Chinooks carried U.S. and Allied troops in history's largest aerial assault to outflank Iraqi forces and cut off their retreat from Kuwait.

In the mid-1990s, Boeing and the Army agreed that the Chinook fleet should undergo a second modernization program. This program will extend CH-47 service well beyond 2030, virtually guaranteeing that Chinooks will handle U.S. Army missions for at least 75 years. Boeing is currently in low-rate production of the CH-47F, scheduled for first delivery in 2004. Boeing is under contract to modernize at least 300 Chinooks to the new F-model standard, which features reduced vibration effects, an integrated cockpit control system and more powerful engines with digital fuel controls. These improvements will make the Chinook fully compatible with 21st century operational and war-fighting requirements and improve the aircraft's efficiency and effectiveness.

U.S. Army Special Operations Forces also operate more than 30 Special Operations Chinooks, designated as MH-47Ds and MH-47Es. The MH-47Es are among the most advanced rotorcraft in operation today. They incorporate fully integrated digital cockpits; forward-looking infrared, terrain-following/terrain-avoidance radar; long-range fuel tanks; and aerial refueling capability. Special Operations Chinooks perform low-level, high-speed flight for infiltration and exfiltration of Special Operations teams at night and in adverse weather. Boeing and the U.S. Special Operations Command are currently discussing a Special Operations Chinook upgrade program that will provide a fleet-wide common avionics suite and several other system improvements.

### **CH-47SD Chinook Helicopter**

The CH-47SD International Chinook is the most advanced model of the world's most efficient heavy-lift helicopter. About 800 Chinooks are currently in service in the United States and more than 15 other nations. Among international customers, Chinooks often devote most of their flight hours to nation building and humanitarian missions.

The CH-47SD, or Super D, is the most recent and capable of a variety of Chinook models designated for international service. Standard features include a fully integrated digital cockpit management system with full-color displays; powerful and economical turbine engines with digital fuel controls that can handle loads up to 28,000 pounds; long-range fuel tanks; and a reduced-vibration airframe. A number of options are available to meet other customer operational requirements.

Because the Chinook utilizes tandem-rotor configuration that translates full power into lift, the rotorcraft can carry loads significantly greater than its own empty weight. Continuous product improvements have increased the aircraft's operational capabilities across a wide spectrum of military and civil missions. The Chinook's high speed and large payload make it as effective as three utility helicopters and give the CH-47 the lowest cost-per-ton-mile of any transport helicopter available today.

**RAH-66 Comanche**

The Boeing Sikorsky RAH-66 Comanche armed reconnaissance helicopter is the centerpiece of the U.S. Army's aviation modernization plan. This reflects the Army's overall transition to an Objective Force that will utilize advanced weapon systems and smaller forces that are responsive, deployable, agile, versatile, lethal, survivable and sustainable.

The Comanche is a twin-turbine, two-seat (tandem) armed reconnaissance helicopter with projected missions of armed reconnaissance, light attack and air combat. First deliveries will occur in 2009-2010.

The Comanche program validated a number of aircraft systems and components and built and flew two flight-test prototype aircraft in its Demonstration/Validation/Prototype phase from contract award in 1991 through 2000. The program is currently in its \$6.4 billion Engineering and Manufacturing Development phase. During EMD, the program will continue flight tests and validation of the Comanche's fully integrated navigation, communication and passive-sensor targeting system, known as the Mission Equipment Package. In addition, the program will build and deliver nine new Comanches for additional flight tests and U.S. Army operational test, evaluation and training. The Comanche program will reach full production in around 2015 and manufacture at least 650 RAH-66s for U.S. Army service.

The Comanche is the world's most advanced rotorcraft, featuring an all-composite, low-observable airframe that evades detection by radar, infrared and acoustic sensors. Its dynamic system includes a five-bladed bearingless main rotor, split-torque main transmission and an enclosed tail rotor system. Flight controls are fly-by-wire and triply redundant. All aircraft systems are integrated in the Mission Equipment Package that contains a digital avionics suite with advanced programmable communications; an integrated helmet-mounted heads-up display; a night-vision pilotage system and an electro-optical target acquisition and detection system that utilizes advanced, passive, long-range, high-resolution sensors to generate real-time broad-band information to battlefield commanders about enemy dispositions; self-healing digital mission electronics; and triply redundant on-board system diagnostics. The aircraft can utilize high-speed and aerobatic maneuverability to avoid detection and engagement, and carries both missile armament in retractable bays and a retractable Gatling gun slaved to the helmet display. The Comanche is designed for easy field maintenance and repair and eliminates intermediate maintenance requirements.

The Boeing Company in Philadelphia is the Comanche's Mission Equipment Package integrator. Sikorsky Aircraft, of Stratford, Conn., is the program's airframe integrator. The Boeing Sikorsky Team includes several of the nation's leading aerospace companies, including BAE Systems; General Dynamics; Hamilton Sundstrand; Harris, Kaiser Electronics; LHTEC; Longbow, Ltd.; Lockheed Martin; Moog; TRW; and Williams International.



**V-22 Osprey**

The V-22 Osprey is the first aircraft designed from the ground up to meet the needs of all U.S. armed services. The aircraft can transport Marine Corps assault troops and cargo using its medium lift and vertical takeoff and landing capabilities. It meets U.S. Navy requirements for combat search and rescue, fleet logistics support, and special warfare support.

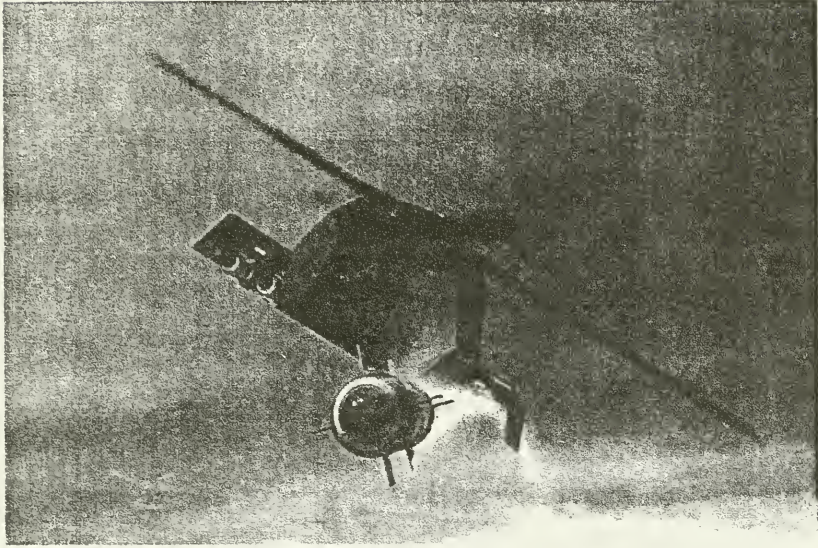
The V-22 is a tiltrotor aircraft, taking off and landing like a helicopter, but once airborne, its engine nacelles can be rotated to convert the aircraft to a turboprop airplane capable of high-speed, high-altitude flight.

It can carry 24 combat troops, or up to 20,000 pounds of internal or external cargo, at twice the speed of a helicopter. It includes cross-coupled transmissions so either engine can power the rotors if one engine fails.

The rotors can fold and the wing rotates so the aircraft can be stored aboard an aircraft carrier.



Boeing is responsible for the fuselage and all subsystems, digital avionics, and fly-by-wire flight-control systems. Boeing partner Bell Helicopter Textron, Inc., is responsible for the wing, transmissions, empennage, rotor systems, and engine installation.

**UCAR Unmanned Combat Armed Rotorcraft**

In May 2002, the U.S. Defense Advanced Research Projects Agency (DARPA) and U.S. Army selected Boeing as one of four teams for the initial 12-month concept development and system trades phase of the Unmanned Combat Armed Rotorcraft, or UCAR, program.

During Phase I, Boeing will conduct mission effectiveness and affordability trades to develop and optimize an objective system design. After the concept development studies are complete, DARPA will choose two contractors for a nine-month preliminary design phase, followed by a system development phase that will yield two prototype vehicles. In the final phase, ending in 2009, the Army will take ownership of the winning platform and begin its system design and development, leading to fielding the system sometime around 2012.

UCAR will be an all-weather, highly autonomous and survivable unmanned rotorcraft fully integrated into the Army's objective force combat maneuver force structure. The system, which enables ground maneuver force superiority, will be capable of collaborating with multiple UCARs and other manned and unmanned systems. Unlike other unmanned aerial vehicles, however, the UCAR will not have a dedicated ground station. Instead, the system will integrate into existing command and control platforms, such as the Future Combat Systems command and control vehicle and combat aviation. Capable of autonomous mission planning while in flight, the UCAR will request guidance from a human operator only for tasking and final weapons authorization.

### Canard Rotor/Wing (CRW)



**CRW - Manned Version**

Currently under development at Boeing Phantom Works is the next generation high-speed, vertical takeoff and landing (VTOL) aircraft known as the Canard Rotor/Wing or CRW. Under an agreement with the Defense Advanced Research Projects Agency, Boeing will build and flight test two unmanned technology demonstrators to assess and validate this advanced rotorcraft concept.

Designated X-50A, and also known as "Dragonfly", the CRW combines the low-disk loading hover efficiency and low-speed flight characteristics of a helicopter with the high subsonic cruise speed of a fixed-wing aircraft. For both rotary-wing and fixed-wing flight modes, the CRW is powered by a conventional turbofan engine utilizing diverter valves that direct the thrust to the rotor blade tips or aft to the jet nozzle, with dual bleed thrust used during transition. By using a unique reaction-drive rotor system, the CRW concept eliminates the need for a heavier and more complex mechanical drive train and transmission, as well as the need for an anti-torque system.

An operational CRW would be able to take off and land within confined areas, rapidly transition to and from a fixed-wing mode, and operate at speeds in excess of 400 knots. Potential manned and unmanned missions for such a vehicle include reconnaissance, armed escort, tactical air support, communications/ data relay and logistics re-supply. With such flexibility, operations could originate from small-deck ships or forward bases.

Development of the technology demonstrators is being conducted by Phantom Works personnel in Mesa, Arizona, St. Louis, Missouri, as well as several other Boeing facilities. Final assembly of two X-50A demonstrators has been completed at the Mesa facility, with a first flight expected in early 2003.

**COMMITTEE ON ARMED SERVICES  
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES  
UNITED STATES HOUSE OF REPRESENTATIVES**

**U.S. ROTORCRAFT INDUSTRIAL BASE**

**STATEMENT BY**

**DEAN C. BORGMAN  
PRESIDENT  
SIKORSKY AIRCRAFT CORP.**

**MARCH 12, 2003**

**NOT FOR PUBLICATION  
UNTIL RELEASED BY THE  
COMMITTEE ON ARMED SERVICES**

## Introduction and Company Background

Chairman Weldon, distinguished members of the committee, thank you for this opportunity to share with you my perspectives on the rotorcraft industrial base in the United States.

I am proud to represent Sikorsky Aircraft on this occasion. Our company has just celebrated its 80<sup>th</sup> birthday, making it one of the oldest aviation companies in the United States. Our founder, Igor Sikorsky, designed, built and flew the world's first practical helicopter, the VS-300, and we have the privilege of continuing his legacy today.

Our products are currently in service with all five branches of the U.S. military. Our core product remains the BLACK HAWK helicopter and its derivatives, which fly a number of different missions for the U.S. Army, Air Force and Marine Corps. We also manufacture the U.S. Navy's SEAHAWK, and the U.S. Coast Guard JAYHAWK. Our heavy-lift product is called the CH-53, in service to the U.S. Air Force, Navy and Marine Corps.

We also manufacture two different civil aircraft. These include the S-76, which flies VIP transport, offshore oil, emergency medical service and airline missions in forty countries around the world. It also includes the all-new S-92, a 19-22 passenger machine that was recently honored with the Collier Trophy, the aviation industry's highest honor for technology innovation and excellence.

The S-92 has a military variant, the H-92 which is ideally suited to upcoming Air Force and Marine Corps medium-lift requirements, including the Presidential Transport mission that Sikorsky has been honored to fulfill for more than forty years.

Finally, with our Boeing partner, we are developing the Comanche, the next generation stealth reconnaissance and attack helicopter for the Army.



In terms of our total contractual relationship with the U.S. Government, Sikorsky Aircraft received approximately 5,000 contracts from all U.S. Government customers during Fiscal Year 2001, approximately 4,000 during Fiscal Year 2002, and approximately 1,200 during the first five months of Fiscal Year 2003 related to rotorcraft development, production and support. The obligated dollar value of these contracts is approximately \$1.9 billion, \$1.3 billion, and \$1.0 billion respectively.

### **Sikorsky's View of the Current Programs**

I advocate the view that the American rotorcraft industry is fundamentally healthy in the short term. The United States is home to the largest single military helicopter market in the world, and we have a very active and innovative public-private partnership that is keeping America at the leading edge of rotorcraft technology and performance.

In terms of Sikorsky's current product line, we are seeing reasonable, if not stellar, results in the international marketplace. Particularly where there is no domestic manufacturer enjoying tacit government protection.

In the past two years, Sikorsky has successfully delivered military helicopters in Israel, Colombia, Turkey, Greece, Thailand, and Spain. We have seen good civil helicopter sales in China, Korea, Turkey, and most recently Brazil.

We are actively campaigning today for important military procurements that total about fifty helicopters for Canada, Australia and Singapore. Despite intense European competition, we like our chances in these campaigns.

These are good news stories, but I don't want to gloss over the critical issue of protected markets in Europe, which is the second largest market for military helicopters in the world.

Rhett Flater in his testimony made reference to Sikorsky being shut out in a major competition in the Nordic countries – a coalition that claimed to be interested in a single consolidated purchase of aircraft until the closing weeks of the competition. Separate contracts were ultimately awarded to two European competitors providing two very different types of helicopters.

We were also undermined in Ireland, where we were announced as the winners last spring of a competition to provide new maritime rescue helicopters to the Irish Air Corps. We never got to contract, however, because the European competitor who lost filed a lawsuit, and the entire tender was cancelled. We are now starting all over again.

Even when we win in Europe – as when we clinched a nine-aircraft deal in Austria in 2001 – we believe our European competitors were trying to undo the deal with our customers; even after the announcement was made of Sikorsky's victory. Fortunately in this case, common sense prevailed.

As my colleagues here will attest, the helicopter industry is a contact sport, particularly internationally. But in the current environment we are holding our own.

### **Sikorsky's View of Development and Future Programs**

Turning from the today's product line to our products still in development, you can still argue that the industry is healthy and has good prospects.

In our case, we are partners with Boeing on the Comanche program, and with government investment we are rewriting the rulebook on what military helicopters can do. The Comanche has unprecedented intelligence and processing power cloaked inside world-class stealth technologies. The result is a highly capable aircraft that will give the Army overwhelming information advantage in future conflicts.

After a successful restructuring of the Comanche program last year, we are on track to begin assembling the first EMD aircraft in 2003. This great progress on Comanche symbolizes the much greater harmony of funding and schedule that emerged from the restructuring of the program. There are challenges ahead, to be sure, but the program is now fundamentally achievable for the first time in its long history.

The Comanche provides a good story for the health of the American rotorcraft industry in two ways. First, I should note that this is a highly desirable product that will have many potential customers outside the United States. In fact, the only real question is how much of Comanche's technology our government will ultimately choose to share with foreign allies.

Even if we withhold the most sensitive technologies for security reasons, it is certain there will be strong demand outside the United States for this very sophisticated machine. There is nothing quite like it flying today, or even on the drawing board anywhere. Friendly governments will want Comanches in their fleets, for sure.

Second, the way in which we will build Comanche will be as advanced as the aircraft itself. The Comanche factory in Bridgeport, Connecticut, will be high technology, lean manufacturing operation from Day One, incorporating advanced systems that minimize the wastes inherent in any production process and maximize the ultimate quality of the aircraft and its systems.

We will take the lessons we learn with Comanche manufacturing and incorporate as many of them as we can – as fast as we can – back into our legacy production lines for our other products. This Comanche learning curve will help make us a better and more competitive enterprise overall, which can only help Sikorsky as we fight to win contracts in the international marketplace.

We can tell similar stories regarding some of our other major programs for the U.S. Government. The remanufacturing of the BLACK HAWK product from its early versions to the newly designated M-model will bring striking new capabilities to our Army customer. The new aircraft will feature digital cockpits, upgraded engines, improved rotors and transmissions, and numerous other enhancements.

These upgrades to the venerable BLACK HAWK airframe will allow us to bring a more sophisticated machine to the international marketplace. It also gives us the intriguing possibility to develop a truly low-cost BLACK HAWK, based on the technologies in the older versions of the aircraft. Such a helicopter would be a potent export product versus European competitors.

Our U.S. Navy programs continue along well, with the MH-60S multi-mission transporter now approved for Full Rate Production, and the MH-60R SEAHAWK making progress in development as the next generation anti-submarine and anti-surface warfare helicopter. The MH-60R program is scheduled to go into production in 2005, with an ultimate objective of delivering 278 aircraft.

#### **Issues and Implications for the Rotorcraft Industrial Base**

So far I have painted a fairly upbeat picture of the rotorcraft industry from our perspective. We have active, funded programs that hold the promise of advanced technologies, systems, and manufacturing methods.

But like my industry colleagues on this panel, I will caution strongly against complacency or self-satisfaction when it comes to the future of rotorcraft technology. Indeed, we may already be sowing the seeds of our future demise.

The fundamental reason behind this concern is simple: the technology gains we see applied in our products today are partly attributable to the advanced technology work that was done in a previous generation on core rotorcraft science.

I speak from personal experience. As a young engineer in the 1960s, I was hired as one of the first employees of the joint Army-NASA rotorcraft technology center at NASA-Ames Research Center in Mountain View, California.

It was an exciting time. My employer, the Army, was already deep into the use of helicopters to support combat operations, but had no facility at which to develop and test useful technologies and vehicle concepts, which could lead to new operational concepts. In other words, they wanted to become a smarter buyer.

NASA at that time was racing to the Moon, and had excess test capacity for what it viewed as the more mundane aeronautical research projects that took place at Ames. It was the foundation for a great partnership.

But it was also an exciting time because we moved rapidly into important research that advanced the uniquely challenging science of rotorcraft. In the mid-1960s, less than 30 years had elapsed since Igor Sikorsky's first flight in the



VS-300. There were still many undeveloped properties of rotary wing flight that needed to be explored further.

These experiments and tests dating from that first decade at NASA Ames have had a profound effect on current rotorcraft designs and operations. A few examples help underscore the point.

- The advanced rotor system being developed on Comanche today is based on fundamental work on bearingless main rotor (BMR) technology developed at NASA Ames beginning in the 1970s.
- The first full scale rotor noise measurements made on rotorcraft were done in the NASA-Ames 40 x 80 wind tunnel, and this research formed the foundation of helicopter noise reduction work since that time.
- The solution to the issues holding back further development of tiltrotor technology was demonstrated in the NASA-Ames 40 x 80 wind tunnel, and was the basis for the decision to proceed with the XV-15 technology demonstrator aircraft. The XV-15, of course, formed the technology base for the V-22 program. There would be no V-22 program today had this work not been done.

In short, the industry and our military customers took advantage of the NASA-Ames opportunity to deepen our understanding of rotorcraft science and technology. This greater understanding then translated directly into new vehicle designs and new applications for helicopters, giving rise to America's unquestioned ability to command the air immediately above the modern battlespace.

Contrast that excitement, then, against the current state of affairs at NASA-Ames, where national assets like the 40 x 80 and 80 x 120 wind tunnel facilities sit idle for want of money, and we struggle along with our friends in Congress to scrape together funding at even a fraction of historical levels.

Nothing is free in life, and certainly nothing is free when it comes to advancing the causes of science and engineering. In the absence of investments – today – in rotorcraft technology, the helicopters our armed forces will use in 2050 will be no quieter, safer, or fundamentally more capable than the aircraft coming out of our factories today.

And while my remarks have focused on military products and military applications, Rhett Flater has accurately pointed to the potential benefits that commercial helicopters can bring to our country.

It goes without saying that our national air transportation system – dependent on fixed wing aircraft deployed from large hub airports – is showing its age. One out of every five flights in this country fails to arrive at its destination on time, and that ratio spikes even higher in winter months.

Helicopters offer a tantalizing, non-runway dependent alternative to fixed wing aircraft over short hauls, but they are limited by social objections to noise levels that many communities still find unacceptable. Consider the following:

- Helicopter operations in New York City, arguably one of the most important civil rotorcraft markets in the world, have fallen sharply over the past decade, as pressure groups have grown increasingly organized. The city now has just three dedicated heliports, placing an artificially low cap on what that market could actually handle in terms of demand.
- The city of Albuquerque has banned the location of any helipads within 350 feet of any residential area. As a result, two local news stations were forced to relocate their aircraft to the local airport.

- In Virginia City, Nevada, hundreds of local residents turned out to oppose the launch of a new helicopter tour service in their community.
- In Southlake, Texas, the city council has limited by law the number of flights permitted to executives of the Sabre Group from the company's helipad. The annual number of flights allowed is half of what the company requested.
- Boston, a bustling metropolitan center with a chronically dysfunctional airport, no longer has a dedicated heliport. There was another revolution that began in Boston a couple of hundred years ago. Is this a case of history repeating itself?
- Both Seattle and San Francisco have regulations preventing overflights of privately owned helicopters except for emergency use as well.

There is room in our national transportation system for a quieter helicopter, but we need fundamental, industry-wide research on next-generation blade tip technologies and blade control systems. This is the kind of work that can take place only under the umbrella of a national rotorcraft technology program.

While such a technology program could take many forms, as someone who was present at the creation of the Army-NASA partnership thirty-five years ago, I would argue that we should not overlook the tremendous national assets resident at the NASA-Ames Research Center.

NASA-Ames is home to low- and high-speed wind tunnels and rotor and tiltrotor test stands, where the rotorcraft industry has tested its technologies for decades. The scientists and technicians there are active participants in the American Helicopter Society, with strong connections to the people, laboratories

and test beds not only at Sikorsky, but also at the other major helicopter OEMs, university centers of excellence, and other federal research facilities.

These assets at NASA-Ames, and the people who oversee them, collectively represent a unique national capability. Whatever additional support Congress or the Administration choose to provide to the industry should leverage as directly as possible the existing framework of people, laboratories and relationships. This would be both the fastest and the most cost-effective approach to revitalizing the science and technology infrastructure for rotorcraft.

## **Conclusion**

I would like once again to thank you, Mr. Chairman, for your intense interest in the health and future of America's helicopter industry. As today's testimony makes clear, we are challenged on many fronts. There is no doubt that we can meet these challenges. And there is no doubt that increased investment in the core technologies to make rotorcraft safer, quieter, and more efficient are the best strategy to enhance our competitive position in the world marketplace.

Thank you for this opportunity to appear before this committee.





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**QUESTIONS AND ANSWERS SUBMITTED FOR THE  
RECORD**

MARCH 12, 2003

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### **QUESTIONS SUBMITTED BY MR. LOBIONDO**

Mr. LOBIONDO. Admiral Kilcline, Chairman Weldon mentioned the \$197 million in the FY04 Budget Request for the replacement of the Presidential helicopter. I am referring to the VXX Program. How does the Navy plan to accelerate this program to meet the FY07 requirements?

Admiral KILCLINE. The U.S. Navy, through Naval Air Systems Command engineering processes, is currently evaluating concept design studies and an Analysis of Alternatives that will aid in addressing this requirement. In order to accelerate this program it is likely that Naval Air Systems Command will employ an evolutionary acquisition strategy phasing in capabilities through increments. The first increment can be focused on the accelerated initial operating capability required for this mission. Additional risk reduction efforts focused upon schedule and technical drivers will be used to mitigate acceleration concerns. Ultimately, integrating teaming between the prime contractor and Government will be essential to program success. The Navy with OSD and the White House will continue to work together examining options and requirements for this unique mission.



**FISCAL YEAR 2004 NATIONAL DEFENSE AUTHORIZATION ACT—BUDGET REQUEST FOR ARMY AND MARINE CORPS GROUND FORCE REQUIREMENTS**

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HOUSE OF REPRESENTATIVES,  
COMMITTEE ON ARMED SERVICES,  
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE,  
*Washington, DC, Thursday, March 20, 2003.*

The subcommittee met, pursuant to call, at 2:02 p.m., in room 2118, Rayburn House Office Building, Hon. Curt Weldon (chairman of the subcommittee) presiding.

**OPENING STATEMENT OF HON. CURT WELDON, A REPRESENTATIVE FROM PENNSYLVANIA, CHAIRMAN, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE**

Mr. WELDON. The hearing will now come to order. And I apologize to our distinguished panelists for this delay. We are trying to do 11 hearings in one week, and so we start at 9:00 and we usually go to 8:00 at night. Apologize for making you stick around for 40 extra minutes before we start.

This morning the Tactical Air and Land Forces Subcommittee meets to receive testimony from the Department of Defense (DOD), Army and Marine Corps witnesses on the breadth of DOD's current ground force weapons programs and the industrial base that supports those platforms.

The witnesses will also address the technologies and industrial base required to field the Army's future combat systems and meet next generation Marine Corps ground equipment requirements.

This hearing was scheduled in February, however, it is of particular significance today with 105,000 soldiers and 80,000 Marines engaged in combat operations along with Navy, Air Force and coalition forces in both Afghanistan and Iraq.

These personnel comprise a full spectrum of U.S. ground forces including special operations units, light and airborne infantry, heavy armored forces and Marine Corps expeditionary units.

We as Members of Congress have very little control over how things will evolve in either of these theaters of operations but we do want to express our deepest respect and appreciation to our men and women and supporting personnel for their service to the Nation and offer our Godspeed in their mission.

All of the major weapons systems employed by Army and Marine Corps ground forces today were originally fielded in the early to mid-80s. However, many of these systems have received at least one if not several upgrades through technology insertions, in order to address evolving threats.



As you review our ground forces, today's Army is comprised of a light infantry and heavy armored force mix. The heavy force is centered around the M-1 Abrams tank and the Bradley fighting vehicle, currently the most sophisticated and superior armored fighting vehicles in the world, and originally designed to go toe to toe with the best heavy armored vehicles built by the former Soviet Union during the Cold War.

Major upgrades of these vehicles have enhanced the original analogue variance with state of the art digital command and control technologies and thermal sites.

A gap between the light infantry and heavy forces was identified by the Army after the Gulf War. The Army determined that a more lethal deployable and sustainable combat force was required to enhance its capability to respond to a broad spectrum of threats and operations.

To bridge this gap, the Army is currently filling the interim force comprised of medium armored vehicles centered around the Stryker Brigade Combat Teams (SBCT).

The fiscal year 2004 budget request includes \$1.2 billion for a fourth of six planned Stryker Brigades. The Army transformation plan also includes a long term acquisition strategy to fill what it refers to as a 21st century Army, much of which entails the future combat systems, FCS.

The magnitude of the requirements that have been articulated, the process for carrying it to fruition, the attendant costs and the time required to do surveys raise many questions, all of which are our responsibility to address.

The objective force of which the FCS is a major component, is one of the three major pillars of Army transformation, the other two being the legacy force and the interim force.

The Army has requested \$1.7 billion to continue to developing its FCS in fiscal year 2004. A networked system of 19 separate systems, the Army has laid out a very ambitious plan to achieve first unit equipment (FUE) for FCS in fiscal year 2008 and to obtain initial operational capability (IOC) by fiscal year 2010.

Trying to fulfill all of these requirements simultaneously means the Army must maintain its current light and heavy legacy force in some state of readiness, field medium armored brigades and reprioritize procurement funds in its fiscal year 2004 request from the termination of 24 current programs and the deferment of restructuring of 24 additional programs for research and development to accelerate the FCS.

As a result, the subcommittee members must be confident that the Army in its best efforts to transform as rapidly as possible with limited resources has made the right decisions in what appear to be a high risk trade-off in its 2004 request and through future years defense programs (FYDP).

There is some concern that the Army may be taking far greater near term risk than may be prudent or warranted.

The total of 48 terminated and restructured programs in fiscal year 2004 are in addition to the 18 programs that were terminated in the fiscal year 2003 budget to affirm transformation requirements, which I might add this committee fully supported the Army on last year.

The 2004 request may present more risk than the American public is comfortable with, which also includes termination earlier than planned of both its heavy armored vehicle upgrade programs. As a result, the Army now plans to only field two digitized divisions versus the Army's original plan of fielding three and one-third digitized divisions.

A large amount of funds that was originally planned to be requested for these terminated and restructured programs in fiscal year 2004 was reprioritized in order to fund FCS in fiscal year 2004. Consequently, since the Army buys the majority of heavy ground vehicles within DOD, the decision to terminate the Abrams and Bradley upgrade programs early may have both industrial base and affordability implications for FCS and next generation Marine Corps armored vehicle programs as well.

Accordingly, I am concerned that there may not be an adequate industrial base to transform in order to produce whatever type of FCS ground vehicle requirement emerges over the next several years.

Therefore, we are interested in hearing today what analysis the Department of Defense has done in its decision to endorse the Army program.

It is noteworthy to mention that there is much skepticism even within DOD on the achievability of Army FCS goals. The Department's own Director of Operational Testing and Evaluation (DOT&E) and is highlighted in his recent annual report, and "It is highly unlikely that the current schedule for FCS development can be maintained to field threshold levels of mission performance due to the high levels of technological and operational risk.

The FCS block one development schedule calls for a series of limited user tests in fiscal year 2004, yet the government asks industry to prepare proposals in April 2002. And there are currently no vehicle test beds, prototypes or even mature operational concepts to test. Survivability will depend upon quantum leap improvements."

Further, press accounts this week of FCS program briefs to Secretary Rumsfeld indicate he questioned nearly every aspect of the objective force. The report indicates that Secretary Rumsfeld suggested that the Army establish an independent panel to conduct the 30 to 60 day Institute for Defense Analysis assessment of the objective force and FCS.

The DOT&E report and accounts of the Army briefing to Secretary Rumsfeld do not provide the confidence we require to commit today to \$1.7 billion in spending for an aggressive time schedule for fielding FCS.

We all have numerous questions today about what has changed in the DOD requirements, development and acquisition process to make it possible to field some undefined, uncoded number of a family of systems simultaneously by fiscal year 2008 to obtain an operational capability of 2010.

While I am extremely hopeful we could rapidly accelerate a group of technologies and break the current, 10 to 20 out year cycles for complex systems, there is reason for concern given the poor track record of fielding even individual complex programs such as the Comanche and the Land Warrior.

In summary, there is no question first of all that we support our troops in the field, but this hearing is about the next generation of weapons systems for our ground forces and making sure current policies and budgets will sustain an industrial base for the future.

We must do everything we can to make sure that the limited funds available for our ground forces are being wisely allocated. To get a better handle on these complex and difficult issues today, we are pleased to have Dr. Glen Lamartin, Director of Strategic and Tactical Systems, Office of the Undersecretary of Defense for Acquisition Technology and Logistics, the Honorable Claude Bolton, the Assistant Secretary of the Army, Acquisition Logistics and Technology, General Paul Kern, Commander Army Material Command (AMC), Lieutenant General Robert Magnus, Deputy Commandant of the Marine Corps for Programs and Resources.

I would now like to recognize the gentleman from Hawaii and my good friend Neil Abercrombie, for any remarks he would like to add.

[The prepared statement of Mr. Weldon can be found in the Appendix on page 223.]

**STATEMENT OF HON. NEIL ABERCROMBIE, A REPRESENTATIVE FROM HAWAII, RANKING MEMBER, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE**

Mr. ABERCROMBIE. Thank you very much, Mr. Chairman. I think you have stated the case before us. And I think we best get right to the testimony.

Mr. WELDON. I thank the gentleman for his leadership, and he is a tireless advocate for what is right for our troops and someone who is always willing to not just ask the right questions but be there to support the funding necessary to provide the proper equipment. And I appreciate that.

And with that, I will turn to our distinguished panel. Your statements will be entered into the record without objection. And you can have what is time—such time as you may want. I would just ask that you attempt as much as possible to keep your statements fairly short because we have another hearing coming in at I believe at 2 o'clock.

But we want to hear from you and whatever points you want to make, you are welcome to. And again, thank you for coming today.

Dr. Lamartin.

**STATEMENT OF DR. GLENN F. LAMARTIN, DIRECTOR, TACTICAL AND STRATEGIC SYSTEMS, DEPARTMENT OF DEFENSE**

Dr. LAMARTIN. Thank you, Mr. Chairman. And good afternoon, Mr. Abercrombie and Members of the committee.

My name is Glen Lamartin. I serve on Mr. Aldridge's staff. He is the Under Secretary of Defense for Acquisition Technology and Logistics.

I am pleased to have this opportunity to speak to you about changes in the Department's acquisition policies and how they will speed up the fielding of our weapons systems, in particular the future combat systems program about which you expressed specific interest.



I will also address the current and future ability of the U.S. industrial base to effectively and affordably meet our national security needs in this area.

It is fitting that we take time today to consider what we do together to give our soldiers, sailors, airmen and marines the best capability we can so that they will prevail in combat now and in the future.

The Department is in the process of reissuing the DOD 5000 series documents that guide our acquisition activities. Secretary Aldridge is scheduled to testify on these exciting changes before the full House Armed Services Committee early next month.

Among the emerging changes are to reduce the time it takes to acquire systems by using evolutionary acquisition, an approach that seeks to rapidly deliver useful capability, but with the explicit intent of improving that capability over time, to encourage tailoring the program structure—each program structure and approach to match its particular conditions and to foster innovation, learning and continuous improvement in all that we do.

My role includes overseeing for Secretary Aldridge how programs such as the Army's future combat systems will put these important changes into practice. I also see to the proper use of sound management and engineering approaches and in so doing, help to ensure their success.

Regarding the FCS program, I must point out that the program now is under review by the Department for a milestone B decision later this spring. That decision will confirm that the program is ready to move into the next development phase, what we call system design and development (SDD).

Since the review is ongoing and Mr. Aldridge has not approved the details of the program structure and approach, I must temper some of my responses. However, I am pleased to tell you how we are approaching this important decision.

FCS is key to the Army's transformation. It is a challenging—

Mr. ABERCROMBIE. Mr. Chairman, excuse me.

Mr. WELDON. Sure.

Mr. ABERCROMBIE. A point of clarification. Are you testifying that you have a double track review system underway? Is that what you just testified?

I want to make sure I understand. Mr. Aldridge has a separate review process?

Dr. LAMARTIN. Mr. Aldridge, as part of the acquisition process, he serves as the defense acquisition executive. And that—the process includes periodic milestone reviews, which—

Mr. ABERCROMBIE. Isn't that being undertaken by the Army?

Dr. LAMARTIN. No, the Army has its own internal review process that they will present the program to the Department of Defense—

Mr. ABERCROMBIE. Yes.

Dr. LAMARTIN [continuing]. And Mr. Aldridge then in turn will review the specifics of the program.

Mr. ABERCROMBIE. So there is not a review by Mr. Aldridge separately from that which the Army is conducting right now?

Dr. LAMARTIN. The Army will look closely at the program first, then present it to Office of the Secretary of Defense (OSD), the Of-

fice of the Secretary of Defense and Mr. Aldridge, but they will participate in the review at that level as well.

Mr. ABERCROMBIE. Thank you.

Dr. LAMARTIN. It is a challenging program to develop as one system the systems, a family of aerial and ground, manned and unmanned, combat vehicles all linked by a capable command and control network.

We are taking a number of steps to ensure a thorough review of the program and answer the many questions we have about successfully executing this complex acquisition. We are carefully looking at the program and the challenges we face on three basic levels.

First, as a family of systems, what it takes to put the pieces together to make them work well. Second, as a key element of the future Army, how it is that we will integrate it with the other parts of the Army, the legacy forces, the interim forces and modern systems such as Comanche. And third, in a joint context, how we will integrate FCS with systems in the other services to make it even more effective?

To prepare for the milestone decision, we plan a series of reviews by the Defense Acquisition Board (DAB). That group is made of the most senior leaders in the Department and is chaired by Secretary Aldridge. Its members include the Secretary of the Army, and the Director for Operational Test and Evaluation.

In particular, the first of these DAB sessions will focus on the technical foundation on which we are building. It will look at the maturity of the technologies critical to success and the plans to resolve the remaining risks. I should note that the Army has already partnered with the Defense Advanced Research Project Agency, (DARPA), to identify and advance those technologies and systems with the most promise.

The Department knows full well that the FCS schedule is ambitious. Concerns about the program's ability to hold that schedule will be thoroughly addressed during the DAB's deliberations.

To that end, my office is leading a detailed review of the Army's plans for program management and systems engineering. The Department's staff is also planning for test and evaluation, assessing technology readiness levels, developing an independent cost estimate, reviewing the acquisition strategy, assessing needed industrial capability and looking hard at logistics and support matters.

These are typical milestone B activities that in this case, will consider the special nature of the FCS program. Together these activities will ensure an informed decision about proceeding into the next program phase.

Regarding the defense industrial base, the Department has had to make difficult choices as it weighs operational risks and balances its investments into today's forces with the steps it must take to transform to meet future needs. These choices about recapitalization, modernization and the acquisition of new capability can have implications for the industrial base.

For example, we know the shift from heavy armor plated vehicles to lighter more deployable vehicles built of composite materials and specialty metals will challenge the industrial base to respond with new manufacturing technologies and processes.



Yet we are confident that there are adequate opportunities for industry to contribute now in the design, development and integration activities as well as to prepare to meet our future production and support needs.

Although the department believes that forces in the market are positive, and that industrial capabilities will be available when needed for combat vehicles, we will work closely with two Army-led assessments in this area.

One will cover the entire ground combat industrial sector. The other focuses specifically on the FCS. This later will be a continuing effort that will assess the industrial capabilities needed to design, develop, produce and support each of the systems of the future combat systems family. And it will surface any issues it finds for management attention.

The Department is excited about the transformational capabilities that FCS will bring to the battlefield. We believe the changes in our acquisition processes are well matched to this program and the new environment in which we find ourselves.

We look forward to the challenges before us.

Thank you for this opportunity to testify before the committee on these important topics. I will be happy to answer any questions you might have.

[The prepared statement of Dr. Lamartin can be found in the Appendix on page 232.]

Mr. WELDON. We thank you.

Secretary Bolton, the floor is yours.

**STATEMENT OF HON. CLAUDE M. BOLTON, JR., ASSISTANT SECRETARY OF THE ARMY FOR ACQUISITION, LOGISTICS AND TECHNOLOGY, DEPARTMENT OF THE ARMY**

Secretary BOLTON. Thank you, sir.

Good afternoon, and thank you Chairman Weldon, Representative Ambercrombie, distinguished Members of the Subcommittee on Tactical Air and Land Forces for this opportunity to discuss the Army's ground combat, combat support and ammunition procurement programs as well as future technology initiatives.

With me today is General Paul Kern, Commanding General for the Army Materiel Command. And Mr. Chairman, as you already pointed out, we will submit our joint statement for the record.

Today's Army is busier than it has ever been. Our soldiers are helping to win and fight the global war on terrorism. They are defending our homeland. They are serving with distinction in the Balkans in Saudi Arabia, in Kuwait, in the Sinai and in Korea.

And even with a force deployed worldwide, they are transforming to the objective force, aggressively reaching toward the future. We are changing the way we deploy, fight, sustain and use information to become more strategically responsive and dominant across the spectrum of operations.

Our job is to equip, improve and sustain the Army, the world's most capable, powerful and respected land force. We ensure that our soldiers have the weapons, the weapon systems, and equipment they need in order to fulfill any mission they are called upon to perform.

Our efforts are focused in the following key areas: programs, people, production and improvement.

Let me briefly talk about each of these areas. First programs. The Army's comprehensive transformation advances along three major axis—preserving the Army's legacy, bridging the capabilities gap with the interim force, and building the objective force, our future force.

The first path of the Army transformation is to selectively modernize and recapitalize today's force to maintain readiness while preserving resources for the Army's transformation. The Army's modernization program includes the Abrams tank, the Bradley fighting vehicle and several other critical systems that were key to our success in the Persian Gulf War and will continue to have a vital role in our war-fighting capability.

While improving today's force, the Army is fielding a new interim force to bridge the gap between the current force and the introduction of the objective force which begins in 2008. These forces, known as the stryker brigade combat teams, are centered on the stryker family of wheeled fighting vehicles. Beginning this year, the Army will begin to field six stryker brigades over the next five years.

And this new lighter forces will in combination with advanced air and sea lift capabilities, give the U.S. the ability to project military force more easily and more directly around the world.

As our Army modernizes and recapitalizes the current force and fields the stryker brigades, it is also developing our future force, the objective force. The objective force will represent a complete transformation of the Army into a force designed to meet tomorrow's challenges.

The cornerstone, as noted earlier, as a transformation to the objective force, is the future combat system, the FCS, a joint effort between DARPA and the U.S. Army. The DARPA Army team adopted a new acquisition approach through the competitive selection of the Boeing Company and the Science Applications International Corporation (SAIC) as the FCS lead systems integrator, or LSI. The LSI serves as an integral team partner with a total FCS systems integration responsibility which will lead us successful through a milestone B decision later on this year.

The second key area, people. Within the next two to four years, 50 percent of the Army acquisition work force will be eligible to retire. About one third of the Army's civilian population is eligible to retire today.

Ensuring a world class acquisition work force will not be easy. Members of the acquisition corps and the larger work force are at the front of the transformation march. Their abilities to develop systems, manage costs and schedule and procure products and services are absolutely critical to the Army's overall success.

Planning is underway to address the pending critical loss of a significant portion of our world class acquisition work force.

Production, the health of the defense industrial base is key to the Army's ability to continue to provide innovative technology and superior systems and equipment at favorable and competitive prices.

Production is dependent upon the organic industrial base, our depots and arsenals, our defense industrial base, the commercial, the

non-industrial base, and where appropriate, industrial bases from abroad.

It is clear that the defense industry and the industrial base of the 21st century will consist of a complimentary and synergistic mix of private sector and government capabilities.

The mergers in the defense industry that followed the end of the Cold War have left most of these firms stronger, but the consolidation has brought increased challenges to maintain price and technological competition. We must maintain competition when and wherever possible.

When it is not possible, one of our biggest challenges will be to structure business arrangements to ensure better results through the use of contractual incentives.

Improvement, we must constantly work to improve conditions in all of the key areas I have just discussed and to institutionalize process improvements.

In closing, Mr. Chairman, the Army is the world's preeminent land combat force. As we continue to meet the needs of the nation, we thank you for your strong support and valued advice.

With your help, the help of the committee members, we will remain the most respected land power to our friends and allies and the most feared ground force to those who threaten the interests of the United States.

And that concludes my opening remarks, Mr. Chairman. I will be happy to answer any questions. But first, I believe that General Kern also has some brief opening remarks.

[The joint prepared statement of Secretary Bolton and General Kern can be found in the Appendix on page 240.]

Mr. WELDON. Thank you, Mr. Secretary. General Kern, it is all yours.

#### **STATEMENT OF GEN. PAUL J. KERN, COMMANDING GENERAL, ARMY MATERIEL COMMAND**

General KERN. Chairman Weldon, Mr. Abercrombie, I appreciate the opportunity to meet with you this morning and to review the issues that we have in front of us.

I represent today the Army Materiel Command, an organization of more than 50,000 members of military and civilian across our country in 40 states and 38 different countries around the world today.

They are people such as Neil Wachuka, civilian ammo specialist from Davenport, Iowa who today is off-loading ammo ships in Kuwait. Twenty-four years of service. He worries about the safety of the millions of pounds of ammunition crossing his docks.

Stories from Sergeant Major Stewart. Sergeant Major Stewart is the deputy to my field support commander, Brigadier General Vinny Bowles. My discussions with him this morning were interrupted by a SCUD attack in Kuwait as they prepare our forces to move forward.

Or Ms. Bobbi Sue Ridell, one of our specialists from Illinois, 22 years of service to our Army, where she left her friends and family to work in RFJohn, a tent city located in the middle of the desert.

These are dedicated employees who form this industrial base in the organic support to our armed forces.



I have a chart which I have provided here to the right, and copies which will be provided to the Members of the committee which address the organic part of the industrial base as you describe as one of the issues which we must be concerned with today.

That industrial base is noted as 13 government owned and contractor operated and 13 government owned, government operated facilities. They produce munitions as well as the vehicles and they sustain that base for our armed forces.

I do not show on this particular chart the commercial part of the defense industrial base such as the United Defense facilities in York, Pennsylvania, Boeing in Philadelphia or Mesa, Arizona or the General Dynamics facilities supporting their tank plant, which they operate for us in Lima, Ohio.

These facilities were developed when we had a research effort which was focused on building in our arsenals and supplying, sustaining in our depots. Today, these are partnerships across our country. And that is the industrial base, which we must look at, is this partnership between industry and government and what we need for the 21st century.

Now that will be a critical issue which we all must address in the months ahead.

Sometimes though it is something simple as this little piece of metal which is the link for our squad automatic weapon 5.56 millimeter ammunition which causes us the problems. When we found that we went down to one machining center to produce all of the links for the armed forces, and we had to rebuild that this past year so that we were able to sustain our force.

So the industrial base is not often just large facilities and plants that we have to operate. It is sometimes small machine lines which are responsible for those critical components.

This is all very important work and it is a work for which we do everyday to sustain our force. Now we are very pleased to work with a committee who initiated the work that we are doing for the future combat system a number of years ago and got us started with the Defense Advanced Research Organization in that effort.

All of those are critical and I look forward to the questions that you and the committee have today.

Thank you.

[The joint prepared statement of General Kern and Secretary Bolton can be found in the Appendix on page 240.]

Mr. WELDON. Thank you, General, very much.

General Magnus, the floor is all yours.

#### **STATEMENT OF LT. GEN. ROBERT MAGNUS, DEPUTY COMMANDANT FOR PROGRAMS AND RESOURCES, UNITED STATES MARINE CORPS**

General MAGNUS. Mr. Chairman, distinguished Members of the committee, I am pleased to have this opportunity to discuss your corps today and our future ground—

Mr. WELDON. Excuse me, General, can you move the microphone closer to you? Thank you.

General MAGNUS. Yes, Mr. Chairman.

Mr. Chairman, distinguished Members of the committee, I am pleased to have this opportunity today to discuss your Marine

Corps and our future ground combat capabilities along side these find soldiers.

First, I would like to thank the committee for your continued support of our efforts as we continue to ensure our readiness as the Nation's expeditionary combined arms team. The Marines are ready today. They are ready tomorrow, and they—we intend to be the right force for the next fight.

But with your permission, sir, I have submitted my written statement for the record.

Today, Marines, both active and reserve, are operating side by side with our Navy shipmates and with soldiers, airmen and special operations forces at sea, at shore and in expeditionary sites around the globe and here at home.

Marine Corps operations have highlighted the versatility and adaptability of our signature organizational concept, the combined arms air-ground team, which we call the Marine air-ground task force, the MAGTF.

Our rapid deployment of amphibious Marine expeditionary units and expeditionary brigades size forces from the east and west coasts of the United States to Southeast Asia to join today's first Marine expeditionary force illustrates the dramatic speed, flexibility, strategic mobility and scalability of our capabilities.

Our demonstrated day to day forward deployed and rapid reinforcing capabilities of the Navy and Marine Corps team are a powerful national asset today and will be for the future.

Our future capabilities, especially our ground programs are the reason for my presence before the committee of course today. While ground combat capabilities are the central focus of our combined arms teams, the Marines know and value the powerful combat synergy of our air support, our expeditionary logistics and command and control, a synergy that we create in our Marines from recruit training through their education and on to today's battlefield.

And today, sir, over 90 percent of our operating forces are forward deployed, forward stationed, or forward based.

The Marine Air-Ground Task Force has a battle proven commitment to combined arms operations. On a daily basis, we train those cohesive units as fully integrated combined arms teams ready to go forward and stand along side soldiers, sailors, airmen and coalition partners to fight.

Recently, our Marine—maritime prepositioned forces again proved their value to the Nation. In February, we rapidly off-loaded two maritime repositioned force squadrons. Eleven ships within 18 days delivering equipment to over 35,000 combat Marines and the equipment readiness rates were 98 to 99 percent. Maritime Prepositioned Force (MPF) equipment is fully compatible with our total force and just like the Marines, the equipment is ready immediately for employment.

Our total force with 175,000 active duty Marines and nearly 40,000 in the selected Marine Corps Reserves is demonstrating its capabilities today as one team again on land, at sea and in the air.

Our success in global operations of course has not been achieved alone. We work closely with the Navy and the other services to realize the necessary troop potential of joint operations. And the readiness levels that we enjoy today reflect the strong sustained



support of the Congress. And we seek your continued support in the fiscal year 2004 budget.

We will continue our readiness and carefully balance the resources necessary that will ask of you to ensure that we transform the way we fight to continue our play in the joint team.

We pride ourselves on our warrior spirit and our expeditionary culture. And it bonds generations of Marines and continues today as Representative Evans knows full well.

All Marines, active duty and reserve, know that the focus of our combined arms team is the riflemen, our most versatile weapon. At the heart of every Marine beats the heart of rifleman.

Today we must remain ready to fight even as we make difficult resource decisions for the future. There have always been fiscal constraints, but we believe we tried to set the necessary balance in the budget that you see before you.

Recent operations and the scale of our deployments have increased the challenges as we execute this year's budget and will undoubtedly trickle into next year. Your Marine Corps remains ready.

We appreciate the support the Congress has provided for many programs, some of which we may discuss today. The initiation issue of equipment, including body armor for Marines, and ammunition, always something that Marines could use more of.

The lightweight multi-band satellite terminal and other equipment allows us to put the right gear in the hands of Marines, ready for use today. We also appreciate support for important things that sometimes pass beneath many people's radar screens. The right funding for depot maintenance, the right funding for corrosion control so that today's readiness is not sacrificed tomorrow, so that we are always ready for the next fight.

Future operations require levels of operational agility and tactical flexibility beyond that that is provided by our currently aging equipment.

As you know, we had excellent success along with the rest of joint forces in Afghanistan and in unanticipated and very harsh high desert mountainous environments with weapons systems that were well beyond their intended service lives.

We must ensure that the Marines and their equipment are ready, and we will do that. And we also must ensure that we will be ready in the future.

To be able to bridge between today and the future we ask for your continued support of service life extension programs for important weapons systems such as our light armored vehicles, our current generation of amphibious assault vehicles as we wait for the next generation of advanced amphibious assault systems. Programs such as the M1A1 main battle tank firepower enhancement program will ensure that Marines as well as soldiers have the right equipment they need today, tomorrow and for the future.

One of our key themes in preparing for our 21st century challenges is making sure that while we transform we are ready to move and fight today.

As the President explained in June of last year, our security requires transforming the military, ready to strike at a moment's notice, and we intend to maintain that capability.

Our history as Marines shows our commitment to expeditionary joint and combined operations. And when directed, we are ready to lead those operations.

This process of course, requires thorough war fighting expeditionary force development. At the same time as we look to the future, we are working to adapt commercial off-the-shelf hardware as well as the development of leap ahead technologies like our Osprey tilt rotor, the advance amphibious assault vehicle and the joint tactical radio system.

While we focus on today and the future, it is all about a dramatic improvement in our capabilities. A comprehensive description of our programs of course is available in our Marine Corps Concepts and Programs.

In conclusion, Mr. Chairman and Members, I would like to say the Marine Corps and marines and have always had a vision for the future, and we are moving forward to make our current vision of Marine Corps strategy 21 reality.

Joint forces are composed of the unique and complimentary capabilities of soldiers, sailors, airmen and marines and Coast Guardsmen. The Navy-Marine Corpsteam has never been more critical to our nation given access challenges, providing powerful sovereign sea-based force capabilities anywhere, any time.

Our Naval vision 21 will have tremendous impact on the defense industrial base which we share of course great interest in combat capabilities with our sister service and the soldiers of the United States Army.

Of course our aircraft, our ships depots and our ground equipment production lines are all important factors that we must consider as we move from today into the future.

Challenges confront us, indeed confront our nation in days and years ahead. But we must ensure that we consider readiness today, readiness tomorrow as well as for the uncertain future.

The commandant of the Marine Corps and our over 215,000 total force active duty and Reserve Marines appreciate your long, strong and continuing support of our service. Your Corps of Marines is forward and in the finest leatherneck tradition, ready and eager to attack.

Thank you, Semper Fideles.

[The prepared statement of General Magnus can be found in the Appendix on page 253.]

Mr. WELDON. Thank you for your statement. Thank you each of you for your statements and for your commitment.

I am going to ask one question at the beginning and then I have to take a phone call. And then I will pass the time around. But to get the discussion started, let me say to all of you, you know you are among friends here.

We have plused up funding for the Army and Marine Corps by billions of dollars over the past six years and since I have been here. And since I have been in a position of chairing a subcommittee, we have plused up perhaps over \$10 billion.

So we are your friends. We are your supporters. And so our questions here are not meant in any way to undermine where you want to go or what you want to do. I have met with General Shinseki and I have been impressed by his vision, still am, of where we need

to take our Army and obviously same thing with the Marine Corps in terms of the job they do and the vision they have laid out. General Jones and I had a great relationship before he left.

The key concern though is we have seen for instance with the Comanche program, the program was restructured six times. We almost lost that program. In fact if they have another restructuring. It will probably go away in spite of our aggressive support here. Pushing money in because we did not think DOD was putting enough money in the program.

And hopefully now and from what I have seen and the briefings I have been given, we are on the right track now. The program is solidly moving forward. We restructured the program six times.

And so the question comes down and I do not know whether to use the term spiral development—I heard a new term today—evolution of acquisition, if that is the same thing or if that is some new term. I do not know.

But the simple question is how are we going to be able to spirally develop or do evolution of acquisition if 19 different systems that we still have only vaguely defined and field them so that they are networked by the year 2008. That is really what it comes down to. We want to make sure that we do not end up with problems two or three years down the road as we commit billions of dollars which I think everybody on this subcommittee probably supports. But there is a concern there that perhaps we do not have the specificity. And maybe that has got to come over time.

But I think that is certainly where my discomfort lies right now, and I would welcome any of you to respond. Nineteen different systems, still vaguely defined. Tell us how we are going to field them by 2008?

Secretary BOLTON. Well, let em tell you, Mr. chairman, that we have similar concerns. And we have been concerned about that for a long time.

The FCS that we are embarked on, the first increment of that, actually started four years ago. I mentioned in my opening remarks that we had teamed with DARPA. That initial teaming was to go out and look at technologies that we could apply to an objective force. Last year we decided to get on with businesses, and we had four teams, if you will, that we looked at. We selected one team to be our lead systems integrator.

That is important. Two things, sir. One, that we had teamed with DARPA to go and find the technologies. We had a lot of organic capability to do that. But going with DARPA, and going with the arrangement, a Federal Acquisition Regulation (FAR) type of contract, the arrangement so that we could seek technologies we would not normally get into this FCS was important. The second key point was the lead systems integrator as opposed to a prime contractor whose job it is to be—my general contractor—to go out and find the best of the best in this country, bring that technology and put the systems together for us based upon our requirement. And to continue using this other transactions agreement as the contracting vehicle, which allows a lot of collaboration which is exactly what you need, an industry and the government if you are going to bring something on board this complex in the timeframe that we are talking about.



We started with over 3,000 technologies to look at. Last year we boiled that down to 700 then to 540 which we took to the senior leadership of the Army. We have boiled that down to 31 technologies that we are convinced will make the timeframe that we are talking about. We have put on the street almost two weeks ago requests for proposals to industry, saying, "This is the what we are looking for, please bid against those."

That gets to the 19 systems that you are talking about. Last week and this week we are defining for ourselves what that, what the systems is from affordability standpoint. We have been using virtual environments to put engineers requirement types, acquisition types, soldiers to understand what it means to be in a network environment, to start playing with these technologies in terms of zeros and ones right now so we can get a better handle on that so we know what we want to do in the next phase, and which of these technologies we actually have to demonstrate.

We believe we have a plan that allows us to get there. And in 2008, we are not talking about fielding a unit. What we are talking about in 2008 is that is when we begin the fielding. And in 2006, I will go back to Mr. Aldridge, I will ask for a production decision; between 2006 and 2008 we will build the bits and pieces of the first increment of the future combat system. And in 2008, we will start putting that in the hands of the soldiers. We will train them on that. We will outfit them. And in 2010, is when I stand up the first unit of action, not 2008. That is only when I begin doing that.

So we are laying this out. We are looking at how we manage this. This is truly a system of systems. It is not just one piece here and one piece there. The heart and soul of that is to network it together, and that is why the virtual environment that we have with the contractor and with the soldiers and so forth is extremely important.

What we are getting out of the Stryker Brigade is telling us how we can use this network system even better. It allows us to develop tactics and techniques and planning as a stage, if you will, on how we can use this network in the future. And to build the leadership requirements that we need there.

So we are convinced that we are on the right track. We have heard no one say that you will not get to an objective force and change the Army. It has always boiled down to an issue of resources and time. And I will be more than willing to go into how we go about balancing all of that as we go through this hearing.

But that is basically where we are, and we think we are on the right track.

General MAGNUS. Mr. Chairman, if I might offer comments for the Marine Corps.

Mr. MCKEON [presiding]. Absolutely, yes.

General MAGNUS. Of course, we work closely with the Army on the development of many of their systems including joint systems such as Joint Tactical Radio and the Joint Light Weight 155mm Howitzer, which we will field our initial operational capability this next fiscal year.

The Marine Corps' vision that we talked about, sir, though, is in firm grasp. We will have initial operational capability for seven major ground combat systems and weapons systems well inside of

the 5th. We know what our future capabilities are and will field them.

Included in those capabilities, will be the IOCs, next year for a unit operations center which will give us command and control capabilities for the future ground combat force and the MAGTF.

As I said, the joint lightweight 155mm with the Army next year, followed immediately by our high mobility artillery rocket system (HIMARS) which we in the Marine Corps have taken as a lightweight mobile derivative of the proven Multiple Launched Rocket System (MLRS) system and our common aviation command and control system, followed of course by later on, but still in 2008, well inside the FYDP, the joint tactical radio system, our logistic system vehicle replacements. And the advanced amphibious assault vehicle, the only one of these which is a true leap ahead.

So the rest of these are not only well in grasp, properly funded in the FYDP but also they are not so far out in terms of the technological stretch that one would say that all of these IOCs are in jeopardy.

So I am very comfortable that your United States Marine Corps is going to field the future capabilities of the Marine Corps well inside this decade.

Thank you, sir.

General KERN. Could I add one set of comments from the research side of it?

Mr. McKEON. Yes, sir.

General KERN. The challenge that was laid in front of the United States Army to field in this decade the new capabilities looked daunting a few years ago. The Army Science Board reviewed those technologies and came back with an analysis that said, "Yes, this is doable."

The combination of DARPA and the Army and the industries working together as the secretary pointed out has proved that we can do it in this decade. I would invite you to go down to Yuma Proving Grounds to see a demonstration of the active protection systems which we have developed. They work. They will knock down missiles in flight. They will knock rounds and fight today.

I would invite you to go to the caves of Afghanistan where we have taken some of the ground robotics vehicles and already demonstrated that we can get inside these caves and not put soldiers in harms way.

We are working very closely with the National Automotive Center, the NAC, which is a consortium of the defense industries and the U.S. automobile industry working together, looking at advanced propulsion systems, things such as the hybrid electric and the fuel cell vehicles which you see. They are real. They are here today.

We could go up to Fort Dix, New Jersey and see demonstrations today or any other time that you would like of command and control on the move and you will see blue force tracking in the deserts of Iraq in the months ahead as we have demonstrated the capability to put C4ISR not in the laboratory but in fact in the hands of soldiers. You can go down and visit Eglin Air Force Base and see loitering missiles that work.



And so all of the technologies that compose the pieces of the future combat system are here today. And the challenge for us then is to integrate it and to put it together with the operation requirements and concepts which the training and doctrine command had demonstrated through volumes of analysis and simulations. And you can again go to Fort Knox and visit the maneuver battle lab there and see what they are doing.

And so this is all very real, very much in our hands today both from the concepts of operations and from the hardware to make is real. I am confident with your support we can do this.

Mr. McKEON. Thank you, General Kern. I recognize the gentleman from Hawaii, Mr. Abercrombie.

Mr. ABERCROMBIE. Thank you.

Dr. Lamartin. I am going to have to speak to you because you are in effect representing the Department of Defense here.

Dr. LAMARTIN. Yes, sir.

Mr. ABERCROMBIE. The other folks here are all involved with the services as such and for purposes of my questioning, they are subordinate to you in the sense of where I want to go with this questioning.

Can you tell me—my understanding is that there is supposed to be some kind of review, some kind of a check. I am just—I have to go on what the newspapers say because unfortunately at least this Member was not given more detailed information with respect to this review. That is why I interrupted you in the beginning. I want to make sure I understand what is going to take place. Now I have had a conversation with Secretary Bolton. And I think I understand where the Army is going.

Now can you tell me what is the background and the support for the Institute of Defense analyses?

Is the Institute of Defense analyses supposed to conduct this parallel review?

Dr. LAMARTIN. Sir, what I believe you are referring to what came out of a discussion that the secretary had with the senior leadership of the Army. And my understanding, and I was not at the meeting, but my understanding is that he asked them to bring together a team of senior experts to look closely at the future combat systems program and basically answer one key question, "What have we missed?"

Mr. ABERCROMBIE. Time out. I understand that. Who and what is the Institute of Defense Analyses?

Dr. LAMARTIN. The Institute of Defense Analyses is a federally funded research and development center, organization. It is located here in the Washington area. They provide technical and programmatic advice to the office of the Secretary of Defense.

Mr. ABERCROMBIE. It is funded by the Federal Government? It is funded by us?

Dr. LAMARTIN. Yes, sir.

Mr. ABERCROMBIE. Is it funded by this committee?

Dr. LAMARTIN. Sir, I believe your responsibilities include that, yes, sir.

Mr. ABERCROMBIE. Do they work for the Pentagon?

Dr. LAMARTIN. They work for the Office of the Secretary of Defense and for the Chairman of the Joint Chiefs.

Mr. ABERCROMBIE. Have they been involved in this process up until now?

Dr. LAMARTIN. I cannot answer that question directly, sir.

General KERN. I could answer that yes they have in part so that they have been very much an independent evaluator of different functions that we have been performing.

Mr. ABERCROMBIE. Has this been an ongoing process?

General KERN. Yes, sir, it has been.

Mr. ABERCROMBIE. Why are we just hearing about it now. I do not believe they have ever testified. Have they ever testified before us? Do they know more than the Army Science Board?

General KERN. I——

Mr. ABERCROMBIE. I am not trying to give you a bad time. I want to know, because I am not particularly interested in something that—every time somebody tells me there is going to be a bunch of independent experts come in, what it generally means to me is that somebody has a different view and they want somebody to come in who is going to substantiate that view.

What makes the Institute of Defense Analyses at this stage, March 20th, before a May recommendation more capable of making a recommendation to Mr. Aldridge than the Army Science Board or for that matter the National Automotive Center? Do they have experts that can tell us about propulsion of vehicles on that board?

Dr. LAMARTIN. Sir, they have—they can bring together experts who are just that, experts in a wide range of things from war fighting to technology to program management to many of the disciplines necessary for success.

Mr. ABERCROMBIE. Dr., I am sure they can. Why should we have that? Isn't that what the Army Science Board and what Mr. Bolton and what the Army is doing right now and the Marines?

Dr. LAMARTIN. Sir, it is. I believe it is to ensure they leave—that we leave no stone unturned, that we make sure that we have indeed asked all of the right questions and that we are satisfied with the answers. Their voice will be but one of the many voices that we listen to in the deliberations as Mr. Aldridge approaches this important decision.

Mr. ABERCROMBIE. Well, that does not strike me as—I am sure that is your intention. And when you say it I am sure you mean it, but you know, this is my—next year will be my 30th year in public service, and I am sorry that is not the way it works. That is what you have these things happen for.

I would like to know how this institute is supposed to gear up in the next 50 days—I do not even think it is two months—and offer an evaluation which should be seen a level or on par with the evaluation and recommendations that will be coming out of the existing system between the Marines and the Army right now.

If I understand General Kern correctly, this process and I understand my conversation with Secretary Bolton, this process of evaluation has—and experimentation and verification and so on has been underway for a number of years.

Secretary BOLTON. Yes, sir.

Mr. ABERCROMBIE. And if there is a plan—I am going to quote Secretary Bolton. "We believe we have a plan to get there." I believe that is a direct——

Secretary BOLTON. Yes, sir.

Mr. ABERCROMBIE. I may look like I am not paying, Mr. Secretary, but believe me I am. [Laughter.]

It is an old trick. [Laughter.]

Secretary BOLTON. I understand.

Mr. ABERCROMBIE. We believe we have a plan to get there. And I presume that is not a rhetorical device.

Secretary BOLTON. No, it is not.

Mr. ABERCROMBIE. In your testimony, you seem to state in some detail exactly what that is even down to the point of what year you expect of what time of what year you expect to move from step to step. Now I am not so naive as to believe that good intentions are—especially where technology and innovation is concerned, we will always be able to meet a timetable per se. But nonetheless, the game plan is there.

Is there anything in your estimation or in your consideration Secretary Bolton that would enable the Institute of Defense Analyses to make a better—come up with a better plan or evaluation than you intend to come up with?

Secretary BOLTON. I am not sure that—

Mr. ABERCROMBIE. Before May?

Secretary BOLTON. I am not sure they will come up with a better one. I think we have a good plan. I have worked with this organization before. The acronym, we call it IDA. I used them on Comanche. I brought them in to give me an independent look because I had done a lot of things, but I wanted someone on the outside who had no vested interests in what I was doing and asked some key questions. It was a very quick study. In my last life in the Air Force I used them for the F-22.

Mr. ABERCROMBIE. Okay.

Secretary BOLTON. I will tell you—

Mr. ABERCROMBIE. If they were supplementing your work that would be one thing, but my impression is—Dr. Lamartin I am going back to you—my impression is they are going to come up with a parallel investigation and recommendation as opposed to supplementing or being part of the team. And if that is the case, it really is disturbing to me as a Member of this committee. I can tell you that, and I cannot speak for Mr. Weldon on it, but I think I know him well enough that is that—I hope this is not going to become a contest of wills. Because we have a procedure in place for good reasons. And that procedure is not because there is a vested interest so called from the armed—of course there is a vested interest. They want to succeed.

But I operate on the assumption and I am sure other Members of the committee operate on the assumption that the reason is they are looking out for the welfare of the troops and for meeting the strategic requirements of this country with respect to the deployment and execution of missions by troops of the United States.

So they have got a vested interest all right. There is no doubt about it.

But I do not understand why I should pay attention to some evaluation coming in from the side at this stage of the game.



Dr. LAMARTIN. Sir, my understanding is that the Secretary asked the Army to form this team and to ask the Army to look the team for—

Mr. ABERCROMBIE. Is that because he does not have confidence in what the team has been doing to this point?

Dr. LAMARTIN. No, sir, I do not think it is because he does not have confidence. But again, he wants to make sure that we have not missed anything in either the planning or the discussion of this system.

Mr. ABERCROMBIE. Okay. I appreciate that. And I appreciate the difficulty you are under in trying to answer questions that I am having here. But so it is on the record, Mr. Chairman, I am going to be very skeptical of anything coming in from the side at this late date.

And I am going to look very, very closely at what has been accomplished up to this point by presumably competent individuals whose sole purpose is to put forward a plan that can meet the test of the oversight of this committee and the other requisite committees in the Congress.

Thank you.

Mr. McKEON. The chair recognizes the gentleman from Florida, Mr. Meek?

Mr. MEEK. Thank you. Thank you, Mr. Chairman.

I wanted to ask a question as it relates to the Marine operations in South America, the plane that we lost recently in a counter—how would you say, drug task force.

I want to ask for an update on that as it relates to our future efforts in South America. And my second question, you mentioned something in your comments, General, regarding the need of the Marines having more not only ammunition, but also body armor. And what role does that play? Does that mean we have very old body armor that is not up to par to deal with the rifles and things of that nature that we are facing in today's world. Or does that mean we are fighting on different fronts and we may not have all of the armor we need to be able to give to our men and women?

General MAGNUS. Yes, sir. Thank you very much for those questions. Mr. Chairman and Mr. Meek, two different aspects of our support of joint counter-narcotics operations in South America proper, we along with the Army and special operations forces are providing essentially mobile training teams to support host nation forces. The Marine Corps has no operational forces involved in counter-narcotic operations in South America.

However, the tragic loss of two Reserve AH-1W Cobra air crews occurred in our operations as part of the joint inter-agency task force which is assisting other Federal agencies in surveillance along our southern border where there are horses. Unfortunately, a tremendous flow of contraband including of course narcotics and those crews were lost during the night mission assisting the inter-agency task force, sir.

Regarding your second question about equipment, I think I will phrase the answer, it is a combination of both things. One is the equipment that we have today is constantly being improved to provide for example with the personal protective equipment and body armor, getter ballistic protection for soldiers and Marines.

And in fact, the United States Army and their laboratories and the materiel command literally pioneer that as they do with most ground combat and personal equipment for soldiers and Marines. So the truth is we are getting of course more and more lethal. Weapons being used against soldiers and Marines. And obviously close combat is not as some people might have thought some years ago, a thing of the past with long-range precision weapons. It is very much the heart and soul of when you want to take the war to the enemy. And so improved body armor is part of the case.

Ammunition is something that soldiers and Marines use fortunately with great alacrity in peace time, so we are ready to use it and comfortable to use in combat operations and other than chow the next thing a Marine or soldier will ask for is more ammunition.

We do not—running out of chow, but running out of ammunition has some pretty severe consequences.

Mr. MEEK. General, I wanted to really ask the question to the point due to the fact of our ongoing operations, not only in Afghanistan but now, future operations on the ground in Iraq as it relates to urban warfare and close quarters. And I know that the body armor is something that is going to be at close range, something very important to making sure that we have that for the long run.

And I am glad to hear of some of the technologies and would like to hear more about it in the future, need it be from the department or from the Army and Marines, about this. I think it is very, very important. I served five years with the Florida Highway Patrol, and every year we would look for better, lighter, how would you say, something that someone could wear. We would suffer on the road and I know they are suffering from heat and things of that nature as it relates to desert warfare.

And so that is as—as we start to look at that, if you do have something written on it I would love to have that.

General MAGNUS. Yes, sir.

Mr. MEEK. As we look at the future conflicts that we may very well have.

General MAGNUS. Yes, Mr. Meek, I will do that. And I certainly would like to pass this to General Kern to provide the response from the United States Army.

General KERN. I wish I had Specialist Ashline here with me today. I will tomorrow for the Senate, and I invite you if you want to come over. We have some of the ceramic plate that he was wearing in Operation Anaconda, which is the body armor that the Marines and the soldiers have available to them today, where it stopped an AK-47 round that was right over his heart.

We have body armor today that is in fact body armor as opposed to the flack jackets or protective vests of previous battles. And we are continuing to improve that. And I would be more than happy to invite you up to our laboratories to show you the work or bring it down here to show you the work that is being done.

On the munitions as I mentioned earlier, those links become a critical part of the small arms weapons that we produce. We have surged that effort. And we have checked as recently as early this morning with our forces. And there is no one that is telling me they do not have enough.

Mr. MEEK. Mr. Chairman, thank you so—



Mr. WELDON [presiding]. Thank the gentleman. I want to thank the gentleman, as a freshman Member, he has displayed some very keen insights in both hearings today. So congratulations——

Mr. MEEK. Thank you, Mr. Chairman.

Mr. WELDON [continuing]. For all of the work you are doing.

The distinguished gentleman from Missouri, is recognized for five minutes.

Mr. AKIN. Thank you, Mr. Chairman. I have got two fairly quick questions. General Kern, first of all, what are the risks associated with the FCS time line in regard to maintaining your current weapons capabilities and the transition there? That is the first question.

Second is, with the transformation program, I come from more of a business and industry point of view when you put more money in to things, you put more equipment into something, a lot of times you are replacing labor with machines. Is the same sort of principle going on with the Army transformation? Will you need less people and will you be more effective with fewer people? Or how do you see that affecting your overall number of actual soldiers?

General KERN. On your first question, the risk right now is a careful balance of the assessment of the readiness of the current force versus your investments in the future force. I think as well all know over the past dozen years accepted some risk by not acquiring new systems. And as pointed out by both the Marine Corps and the Army's position today, we are wearing out the equipment that has been in the field for the last 20 years. And so we must replace what we have there. And we must do that as quickly as we can and bring those two events together, the wear out of our current equipment as well as the introduction of the new equipment to reduce that risk.

The challenges as the Secretary pointed out one of balancing the resources that we have available to maintain the readiness of the current force while we bring on the new capabilities. We believe that that risk is in balance today, but it is one we must judge each year as the world conditions change. And as we see the future unfold in front of us.

But I do not see that we have a choice. We must modernize our forces for the 21st century. And we must do that while maintaining the readiness of the current force to fight whenever we ask them and to win when we ask them.

On your second question, the people aspects, I think of all the services today are being challenged. In the United States Army today is—has about 490,000 people on active duty. And we have called up more than 130,000 reservists to support us both the United States Army Reserve and National Guard. It is a one Army fight committed around the world, and they are supporting both here in the homeland as well as deployed.

We see in the future and the challenge to us is to reduce our deployed footprint, not to reduce the total number of people and the number of places that we are asked to support the United States in its security mission. And so the numbers are dependent upon how many places that one has to support that operation as well as the size of the force that you have deployed.

We intend with our future systems to reduce the number of support structures that are required in the future to deploy the force. And so we will do it more by reach back and we will be looking for more reliable systems which are more agile in their ability to perform multiple missions.

We see robotic systems both airborne and ground as potential for the future to reduce some of that requirement for deployed forces in terms of the number of people, but it is still going to be a requirement to support them potentially with the reach back here in the continental United States. So the challenge then is to provide the agility by not requiring us to send so much forward. But being able to support it very effectively from wherever we are asked to.

And the second part, when you get down to the hand to hand battle of the infantrymen, whether he is a marine or whether he is a soldier, numbers count. And we are not going to short our forces in that close knife fight not matter how you count it.

Mr. AKIN. So I think I heard what you said first of all, you see more of a change or shift of where the people are deployed with the transformation as opposed to the number of people over all. Did I understand you correctly?

General KERN. That is correct.

Mr. AKIN. And you are saying you are going to deploy fewer people forward?

General KERN. That is our intent. In the design of the future force, we will not require as many people deployed forward to support the forces that are doing the fighting.

Mr. AKIN. You will not have as many people forward who are support or as many people forward who are fighting? I am not quite clear on what you are saying.

General KERN. We clearly are planning not to have any many people in the support structure forward.

Mr. AKIN. Forward.

General KERN. I cannot tell you on the number of people in the fighting force—

Mr. AKIN. Because it depends on—

General KERN [continuing]. Because it depends exactly on what we are asked to do.

Mr. AKIN. So in other words, the people you have forward, the theory is you want them all to be fighters and you want to have all of the people back being supported if you could do that—

General KERN. In an ideal world, that is exactly what we would like to do.

Mr. AKIN. Okay, thank you.

General MAGNUS. Mr. Chairman, if I could respond to Mr. Akin. As I believe you know sir, you have got a company of 3rd battalion 24th Marines. And I strongly support what General Kern said, particularly in close combats whether it is in the mountains or the caves of Afghanistan or in a built-up urban area, quantity has a quality all of its own as far as infantry. And as I said earlier, I think my soldiers, friends, will agree that the most versatile weapons system America has got is a fighting man and woman. And if we give them the right kind of gear and the right shape.

To answer your question though, obviously FCS is not ours, but its absolutely right. And I said earlier about initial operational ca-

pability, the advanced amphibious assault vehicle of course is our leap ahead technology mobility system on the ground, and because of that we recently restructured, adding a year of systems development so that could address that future risk and at the same time we continue to ask for the support of the committee to take our current generation AAV-7s and give them the upgrades that they need, a SLEP so that we do away with the risk of today's readiness force, that we are already ready to fight tomorrow even while we are transforming.

The same goes quite frankly with SLEPs of our light armored vehicles. And improvements we are making to the finest made battle tank in the world the M1A1s and M1A2s. And there is nobody going to stand on the battlefield against soldiers and Marines with equipment like that.

And the last one I will just give you an example on was our aging but still very capable TPS-59 radars. They are in places that Marines would be amazed to find out if you told the World War II Marines that we were in places like Uzbekistan, Afghanistan, and other locations, not with Marine air ground task forces, but with the joint force providing surveillance against all kinds of interesting air targets that we are concerned about.

Our future system is a multi-role radar system, but we worked with the Congress over the past several years to make sure that today's system which is deployed completely outside of the United States except for the school house, continues to work in support of the joint forces.

So we again need to keep that balance to make sure that soldiers and marines are already to answer the Nation's call.

Mr. AKIN. Thank you, General. Thank you, Mr. Chairman.

Mr. WELDON. I thank the gentleman. And I now yield item to the distinguished gentleman from South Carolina—

Mr. WILSON. Thank you, Mr. Chairman. And I would like to thank all three of you for being here today. And it is particularly good to see General Magnus in that you and I have a distinction. And that is that we both were commissioned in June 1969 in the Shenandoah Valley, you at University of Virginia. I was at Washington and Lee University.

So proud of your service. And you have a very distinguished career. And I have—just want you to know having been in Uzbekistan and Kazakhstan and Kuwait in the last month to see the equipment that our troops have and with all of our minds on the troops this moment, I feel so good about the equipment they have, the training they have, and the leaders they have. And I have certainly reassured a lot of family members that I feel very good thanks to the efforts that you all have made, to make it possible for our troops to have the best equipment.

And I have a particular interest in the stryker support platforms. I think this is an extraordinary innovation and very positive. But as a member of the National Guard for Secretary Bolton, my concern is the modernization of the National Guard mountain forces. And I appreciate General Kern pointing out one Army fight because that is the way that I feel that it is, and I know that Guard members I work with are just so enthusiastic of doing everything and anything that they can to participate.



But I am concerned about the modernization. If you could bring me up to date on that.

Secretary BOLTON. Well, I think that is a legitimate concern. That concern is shared by the leadership in the Army. I think as you look at what we are doing in the stryker brigades, particularly one of those going to that component of the Army, that is a clear indication that we believe Guard and Reserve and the active is all one Army. You see how we are operating today and you have just mentioned that. We cannot do the job that we are called upon to do without the Guard and the Reserve.

And in order for them to be effective, they will have to have the equipment. They will have to have the training and the tactics in order to fit in seamlessly as some of the other services have done.

As we look to the future, first on the stryker and we have the brigade dedicated to that component of the Army, as we look to the objective force, as we look to the FCS and we look into fielding and modernizing the entire Army, we are relooking at what we have done in the past which is basically been a flow down the Guard and Reserve and saying that is not the way to do business in the future.

It is my task to come back to the leadership on the equipment side, the materials side, and say, "Here is how I think we can do it." it is then working with the leadership across the Army to figure out how we make this happen in the future.

But clearly the intent is to have one Army that is capable of doing the job. Now the question is how best to go about making that happen.

Mr. WILSON. And specifically, the Abrams tanks, the Bradley fighting vehicles are being modernized in active components, but it is not being funded in the Guard. And so will that be addressed? And you had specifically indicated flow down. We would sort of like to avoid that.

Secretary BOLTON. I know, so would we. This—we do review this, and we are reviewing that now. The constraints that we have are mostly on one of just funding and balancing against the other areas I talked about earlier, whether that is the Stryker or the FCS. And then to flow down as quickly as possible the modernized portions of the Bradley or the Abrams and so forth.

I am not sure that we are going to be able to satisfy you nor the Guard or the Reserve as quickly as we should—

Mr. WILSON. I appreciate you being candid.

Secretary BOLTON. I understand—as quickly as we would like.

Mr. WILSON. Right.

Secretary BOLTON. But I can tell you the leadership and the rest of us fret over this. We tried the best we can to figure out how to do this. If you look at the operation right now, you saw the equipment, we are flowing to anybody who is in harm's way, and I do not care what you patch is, you are going to get the best equipment and the best training. And as we come out of this, we are trying to figure out now how do we do this across the board. And I just do not have the answer to that right now.

Mr. WILSON. Well, and in fact you say, do not have the answer, but I think you are doing it. And that is those who are in harm's way have the best equipment.

And I thank all three of you for being here today and yield the balance of my time.

General KERN. Could I add one comment? The Army is planing right now and needs six stryker brigades one of which will go the National Guard and that is planned not as a flow down, but as a first force fielded to the Pennsylvania National Guard. And that is in our plan today. The National Guard is also conducting all of our future missions as we see it right now in the Balkans, Bosnia and then Kosovo and in the Sinai. And the equipment that we use there is not—has not been the traditional Abrams and Bradley, but it has been up our HMMWVs or Humvees.

And so how we configure and equip our forces for the 21st century is question which we all need to ask and make sure that we are giving the right equipment to the right mission for the forces regardless of what their component is.

General MAGNUS. If I could also just briefly add, I know we are talking top the Guard which is a strong part of the force that we need to bring to the field here at home as well as overseas. But we in some ways have the same and in some ways a different problem than the national army that—the greatest Army we have got in the world, thank God—because the Marine Corps Reserve is a smaller fraction of our total force, about 40,000 out of about 215,000 total force Marines. But the only thing that prevents us in getting the exact same equipment at the exact same time to our reserve forces as the active forces is simply fiscal constraints and affordability.

It is not a flow down plan in the Marine Corps. And in fact, the Reserve—the two Reserve battalions that were activated a year ago for support missions here and in some cases we have got Reserve platoons and companies replacing active units in places like duties in Guantanamo Bay. They have the exact same equipment before they are mobilized as the active force. And to the extent that we can do that, we will, because just like the Army we have many units that literally are first responders and first to fight. And our Reserve battalions and our Reserve aircraft squadrons flow early in all of the deliberate plans.

And of course, some plans we get are not so deliberate like what happened after 9/11. And they flow early.

Mr. AKIN. Thank you very much.

Mr. WELDON. I thank the gentleman for his questions.

General, would the Army ask for additional digitized units if funds were made available?

General KERN. I think the Army will always take additional funds. We are always trying to balance the resources that we have. And clearly we have unfunded requirements that we prioritize that would be used for any additional funds which are applied to meet Army requirements.

Mr. WELDON. What options are under consideration to do this and transform the industrial base in order to produce whatever FCS type ground vehicle would be identified?

General KERN. The transition and transformation of the industrial base is one which we are conducting a number of studies on right now. I would tell you that our current industrial base needs to be modernized. If you—the Lima Army tank plant was facilitized in the 1980s for the Abrams tank, and that is almost 20 years old



right now. We have facilities that produce the—all of the smoke, the phosphorus rounds and Pine Bluff arsenal that one of the lines is a legacy of World War II.

We have production facilities which are in some cases underutilized and in some cases the demand is exceeding our capacity. And so we are working double and triple shifts seven days a week.

So we have to balance all of that to meet our future requirements. What I cannot tell you precisely though is what we will need for the composite materials, the new work that is going to come out as part of the future combat systems. And so we will work with the lead systems integrator and with the development of those new capabilities to ensure that the industrial base can both maintain the readiness of our current force as well as we have transitioned to the new force.

Mr. WELDON. When do you expect to have some of those options available to give to us?

General KERN. The next phase, which follows Milestone B this May in the systems development, and we will start to put the definition on what that is. As part of that systems' development that will be defined. And so following this milestone event in May of this year, by next year and the year after, we will be defining what those answers are.

Mr. WELDON. Thank you. The gentleman from Florida is recognized.

Mr. MEEK. Thank you, Mr. Chairman, as it relates to my last line of questioning, I really appreciate the response and the insight that is going on. As you know as it related to our new mission as we are looking at the future, what we call the war on terrorism. I think soldiers and Marines are going to have a serious—how would you say as it relates to defusing not only non-state sponsored terrorism, but also what we may call quasi-state sponsored terrorism that is going on in Afghanistan right now and in other areas. And like the chairman said as it relates to the question and concerns, it is definitely in light of the fact that we are your cheerleaders in the Congress in being the Armed Services Committee because we have to explain to everybody else the reason why we are spending the dollars that we are spending.

General Kern, you mentioned something earlier about working along hand in hand with the private sector as we start to move down the path. Could you elaborate on that because you kind of threw the ball in our court saying that we are looking forward to hearing more from this subcommittee or this committee on that?

General KERN. There are many areas in which the investments in the commercial sector and in our universities which we fund a great deal of, produce product and capabilities that we can use very well with our armed forces. The investments which have been made in propulsion systems which I referred to earlier through the national automotive industry which we work through in the National Automotive Center (NAC), which has been sponsored by both the Congress and by the Department of Defense, working together, is one example of that. The automotive industries are spending billions of dollars on research and hybrid electric and fuel cell alternatives. And we will leverage that as we look at the propulsion systems for our future platforms.

In addition, we have sponsored and will be fully operational, a university affiliated research center at MIT this year, which is co-sponsored with industry, the Defense Department and industry looking at nano-sciences as applied to the soldier. And they will specifically look at the kinds of things which you refer to in terms of being able to provide protective equipment, monitoring equipment, uniforms and lightweight equipment for our soldiers and Marines. And we believe that a lot of that will also have some spinoff in to the homeland security area for our first responder, whether they be Emergency Medical Technicians (EMT), police or firemen.

And so those capabilities there that we are working in the sector with our research and has its—it spins back into the commercial operations as well.

You have seen things like the global positioning system which was a Department of Defense sponsored program, and our investments in that have spawned an industry today where in navigation systems we are only a tenth of 1 percent of the total market in the DOD.

So again, we look then to the commercial sector for what they can provide us in those navigation tools.

We have looked at a number of industries in the materials that are being used to produce equipment for soldiers that today might be used for camping which we find that we can then leverage that and also be using it for our equipment for protection against the elements and many of those are spun off of work that is done.

Stated at our soldier research center, moves off into the commercial center and then back again into the military sector.

There are dozens of operations like that.

The food that we eat, the Meals Ready to Eat (MRE) really started out with our developing that and the freeze-dried food the made it into the commercial sector and now back into our sector.

We go—we are looking today to partner with as many different industries from small business all the way through our bigger corporations such as the automotive industry to develop those capabilities which we can use for the military.

Secretary BOLTON. If I could just add to General Kern's comments on industrial base, General Kern and I have partnered on looking at industry, the defense industry, as well as our organic to see how we are going to use that industrial base and make it viable for the future.

There is a near term particularly with the—some of our companies where there may be gaps in production and then how do we go about taking care of that because I need that same industry when the FCS comes along. And there are ways of handling that, and we are doing that.

But in the long term as General Kern's already pointed out the question is, does the industrial base meet the future needs, 10 years and 15 years from now? And I will tell you in some regards, they do not.

Along with the things that General Kern already talked about, the FCS will be networked centric systems of systems. The heart and soul is the network. Where is our capability to generate millions of lines of code and do it quickly, and not only for the first increment, but for all of the spirals that go on within that incre-

ment. And where I need it in terms of hours or days, a months maybe, not in terms of months and years. Where is that industry, and how do I develop it?

We are looking at technologies that involve lasers, particularly solid state lasers on the battle field. Where is the technology to drive that and how will industry fit in that 10 years and 15 years from now?

Or if I look at electric guns and a whole host of other things, quantum computers that will be here in 20 years——

Mr. MEEK. Mr. Secretary, I am sorry, to cut you off. You just hit on a point that when we talked about the private sector part of this, and how we move our Army and Marines ahead as it relates to having what they need to have, we talk about those industries and I know we are talking about mainly U.S. but I would believe that there is some level of procurement that is overseas. Am I correct?

Secretary BOLTON. Oh, yes, sir. And in my opening comments, as I look at the production part of my responsibilities and the industrial base part of that, I look at the organic capability that we have. I look at the defense industrial base. I look at the commercial non-defense in this country, and where appropriate, overseas and see how we can bring that all together. Because there are benefits both to this country and to other countries in certain areas to do that.

Our task now is to look out in to the future, take care of the near term, and we are working on that. But in the future, we have to ask where do we want to be? Then work with industry to make that happen. And particularly when we look at the commercial side and particularly in the information technology (IT) area, where they tend to lead defense—how can I take a commercial entity and turn that around quickly in terms of hours, maybe a week to war time footing? How can I do that? It is a question we have not answered yet.

But if I can, and I can partner very, very well with a commercial industry, I can also do that in a depot if I can bring in outside work that is of interest from a commercial standpoint and use some of the facilities and capacity that I have in the depot, or even ammo plant and make that a viable operation, and the reason I need that is sooner or later the balloon does go up and I need to some basic core capabilities that come from the ammo and the depot. How do I turn that over in 24 hours?

Those are questions that we are going to have to answer if we want to have a real good relationship and partnership between commercial defense and the Army.

General MAGNUS. Mr. Chairman, if I could just give a few brief comments to answer some of Mr. Meeks comments.

In several areas the Marine Corps is very much like the Army and is partnering with universities and colleges as well as industry. And of course, to a great extent, we are literally piggy backing off of the tremendous effort made by the Army Material Command and its labs.

The Marine Corps has a research university at Penn State, which the Congress has strongly supported and we are now sustaining the relationship there. And that is not only science and



technology research, but that is literally brain research. In other words, to think in areas where we do not have the capability or the assets and to support us in things like logistics.

We have an extensive fellowship program as does the Army, where we send Marines to places like FED Ex for a year to learn not only what they do, but the kind of equipment that they use that we can incorporate in our logistic systems and in our planning, strategic planning, about how we do things like supply chain management.

Our Marine Corps War Fighting Lab works in concert with the Office of Naval Research on the very same things that Secretary Bolton was talking about—real guns for fighting vehicles of the future. And clearly for the Navy, the same kind of things—electromagnetic guns for ships.

We work with Kansas State University, again with the support of the Congress with our joint non-lethal weapons laboratory to be able to field potential technologies like nano-technology. And of course our joint lethal weapons program down at Quantico, another thing which has been strongly supported by the Congress over several years, is working to bring to the 6-4 threshold, that is the threshold to which we could actually deliver systems for things like the advanced tactical laser and the area of denial millimeter wave radar.

Overseas, the industrial base is of course and a concern of our. An interest because there are very good things that are happening over there, but also we want to be able to bring this technology home. A great example of that is the joint light weight 155mm which was technologies royal ordnance that the British started, and of course we improved—we redesigned it, and we are building it in America.

And things like the Pioneer UAV, which is the only routinely sustained tactical UAV, something we got from the Israelis a generation ago, and quite frankly we in the Army are quite eager to start fielding American designed American developed, American tested, and American built systems like that.

So there is a balance. There is a two way street, and we have just got to make sure the balance is in our court.

Thank you, sir.

Mr. WELDON. Thank the gentleman, and thank you for your answers. A question before I move to Mr. Abercrombie, for fiscal year 2004, the Army stated it has a \$1 billion shortfall for war reserve ammunition and a \$130 million shortfall in training ammunition. The Marine Corps has identified \$100 million shortfall for ammunition.

Are there any other shortfalls that you have that need to be addressed as a result of opening war stocks in the Gulf?

General KERN. The other identified shortfall which has always been in our unfunded requirements, Mr. Chairman, in the spares area which covers many different commodities. And we will be looking at how a war time footing because our footing today is based on a peace time standard has increased as a result of our deployments to the Gulf right now. And so part of our supplemental request will be addressing those shortfalls.

General MAGNUS. Mr. Chairman, if I could answer for the Marine Corps. I believe Mr. Skelton has previously asked the Commandant to provide that, and we have a copy of his response, his response and the Chief of Naval Operations (CNO), Admiral Vernon Clark signed a joint letter back.

But to be specific about some of the items on the list, the Marine Corps' list was just under \$600 million of the kind of programs that we feel that because of the fiscal constraints of ensuring that our forces are ready, unfortunately we had to make some tradeoffs.

Now our priorities are in the President's budget as I said earlier, but the truth is there are some really important things that would have to be deferred to later years.

Some of those things are as simple as bachelor enlisted quarters (BEQ). So I will not go into military construction now, but that eventually effects you know, the future readiness of the force by retaining the kind of soldiers and marines that we do.

But I will give you some specific examples, and because when we first calculated what we needed for ammunition, it was several months before we actually started thinking about how much we were going to be using in fiscal year 2003. So in fact what we have done is we have accelerated things that we would have bought later because we know we are going to have a pretty high expenditure rate. Our individual issue equipment, one of the lessons learned that we got from Operation Enduring Freedom—and joining me today is Brigadier General Ken Gluck from our expeditionary force development center down at Quantico—and we learned that some of the gear that we had soldiers and marines and special operations forces were not the best suited for the kind of operations we are facing now.

Some of that was mentioned by Mr. Meek about the weight, and the effectiveness of ballistic armor protection for troopers. But others of it has to do with our load—individual load bearing equipment, the so-called MOLI packs, which of course when you get out way out there, you carry a lot more gear than you thought you had to. And some of this gear just cannot stand the stress of it.

So we are redesigning the future load bearing equipment for Marines. We have about \$65 million of things like that that is literally individual equipment for Marines. Ammunition, as was said, is about \$100 million. Depot maintenance and corrosion control, really important things not for readiness today but readiness in the near term, in the next year or so. And a lot of this gear is being rode hard. It is not being put away wet, but it really is going to need that depot maintenance and unfortunately we made some tradeoffs in those areas.

There is about \$43 million we are requested there.

And the last one I will point out in terms of mitigating risk is our assault amphibious vehicles 7 which we are in a reliability and maintainability and rebuilt program. We were going to terminate that rebuilt down at our Marine Corps Logistics Base at Albany, Georgia, and quite frankly that was going to curtain some of our government industrial base. We do not think that is very wise right now. And looking at things, unfortunately in hindsight now, we think about another \$49 million to get another 60 vehicles through there, put them back out on those Maritime Prepositioned Force



(MPF) ships, get ready for the next fight would be the smart thing to do .

I wish we could have thought of that when we put together and saw how we are using them now. But those are some of the examples, sir, and we strongly support the letter that was sent from the CNO and the Commandant to Mr. Skelton.

Mr. ABERCROMBIE. Thank you very much. Mr. Bolton, in your testimony you emphasize with respect to programs, the Joint Requirements Oversight Council (JROC)?

Secretary BOLTON. It is composed of the vice chiefs of each of the services chaired by the vice chairman of the Joint Chiefs of Staff. There responsibilities are to take a look at the——

Mr. ABERCROMBIE. That is okay. I know what their responsibilities are. I want to know who is on it. They have responsibility, do they not, to set priority of military requirements where acquisition programs are concerned within the context of the national military strategy, right.

Secretary BOLTON. Yes, sir.

Mr. ABERCROMBIE. Okay. Now they do the evaluating, do they not, as to whether these programs are moving along with respect to cost, respect to schedules, respect to performance criteria, et cetera. They have some—and I do not want to speak for the JROC and so I——

I am not asking you to speak for them. I am asking whether or not they evaluate——

Secretary BOLTON. They do——

Mr. ABERCROMBIE [continuing]. Things like cost and schedule and performance criteria.

Secretary BOLTON. To my knowledge, they really do not do that. Their primary function is to look at the requirement. They may bring some of that data in just to get a feel, but basically they ask, is the requirement proper in terms of capability? Does it fit into the overall plan?

Mr. ABERCROMBIE. All right.

Secretary BOLTON. But from a cost schedule performance stand point, that typically is not what they are looking at. That is a primary role.

Mr. ABERCROMBIE. All right, but according to your testimony, they oversee the joint capabilities integration and determination system.

Isn't that supposed to standardize the questions of validation of programs and so on? Achieve a methodology for making this—somebody has got to make a decision as to whether to move ahead, because——

Secretary BOLTON. Right, and now when it becomes——

Mr. ABERCROMBIE [continuing]. In January of this year, they approved the future combat systems mission statement didn't they?

Secretary BOLTON. Yes, they did, which is another requirements document just as the ORD, the operational requirements document, they will approve as well or capabilities document.

Mr. ABERCROMBIE. So in the Pentagon right now, this is a—I presume a joint team, right.

Secretary BOLTON. Yes, sir, it is.

Mr. ABERCROMBIE. You have already got then an institutional system in place to try and make these decisions, make these judgments.

Secretary BOLTON. Well, once again we were only looking at a part of the overall system, and so there are several—you are absolutely right. There are several processes—

Mr. ABERCROMBIE. Well, what have we got the vice chiefs' stage? Jesus, you know, presumably they are there for a reason.

Secretary BOLTON. Oh, yes, sir.

Mr. ABERCROMBIE. They are occupying space?

Secretary BOLTON. But by statute he cannot make the acquisition—

Mr. ABERCROMBIE. Despite what might be said about him afterwards. I do not know. [Laughter.]

Secretary BOLTON. I am not going there.

But by statute, he cannot make the acquisition decision.

Mr. ABERCROMBIE. All right, the reason I am trying to get this down tight is that I want to reiterate I am going to be very suspicious of somebody coming in from the side 50 days before this next decision after the vice—the JROC has already taken things this far. Because unless everybody is dropping the ball somewhere along the line, just taking a shot from the side is not going to be very impressive to me.

Secretary BOLTON. Well, I would agree with you and probably would feel the same way. I will tell you on this particular effort, we probably have had five studies.

Mr. ABERCROMBIE. I will bet you have more than that.

Secretary BOLTON. Well, probably, but in terms of formal things. We just briefed Science and Technology, and I have got one on the IT portion of this.

Mr. ABERCROMBIE. Yes.

Secretary BOLTON. I have had independent studies before, and in fact since I have been given the prerogative here, I have written the rules for this particular study group that you are recommending.

Mr. ABERCROMBIE. I have an idea if I pulled all of the different studies and reviewed everything together, I would be considerably taller than I am right now.

Secretary BOLTON. I think we all would be.

Mr. ABERCROMBIE. If I sat on them.

The last thing, on people, which is something I can speak for the chairman or speak with the chairman on this subject. You pointed out very, very clearly that within the next two to four years, so we transition presidential terms, 50 percent of the Army acquisition work force is eligible to retire, a third of the Army—I am quoting to you now from page eight of your testimony—a third of the Army's civilian population is eligible for retirement. It is no news to people who follow this committee's work that I am very adamant about trying to retain a civilian work force under the jurisdiction and command of the various services. And I am not a fan of contracting out to corporations and others for civilian personnel. I want them working for who is ever commanding the facility of the institution or whatever.

But that said, it is one that we have had a lot of talk today in testimony about the manufacturing work force.

Secretary BOLTON. The defense industrial base?

Mr. ABERCROMBIE. The industrial base. What about—what are we doing? I know what we are trying to do with like apprentices at Pearl Harbor. We have instituted an apprentice program to try and get infusion into the special, highly specialized work force at the Pearl Harbor Naval shipyard.

What are we doing with respect to being able to replace the work force that you site in your testimony or are we moving even further towards this contracting out business, which is very suspicious to me. It is suspicious to me in that I do not mean the process. But it is suspicious to me in terms of being able to—I want institutional memory. I want people who understand what they are dealing with that do not walk off the street.

I mean, my prejudices and biases are very clear. So what is the intention, to the best of your knowledge, with respect to what you have cited in this testimony? Are we going to contract labor or are we going to replenish our institutional support?

Secretary BOLTON. Well, let me answer this for the Army, and then Dr. Lamartin can answer for the Department, because this is not unique to the Army. This is across the DOD, particularly for the acquisition work force.

We have not had a good track record over the last 10 years for a variety of reasons of hiring people. And yet the work force has gotten older and older. Now they are at the stage that I pointed out in my opening remarks. What are we doing?

We have set down and put the—

Mr. ABERCROMBIE. Brand new acquisition responsibilities?

Secretary BOLTON. Oh, yes, sir.

Mr. ABERCROMBIE. If this transformation takes place—

Secretary BOLTON. Oh, absolutely.

Mr. ABERCROMBIE [continuing]. This is not something that amateurs can come in and deal with you.

Secretary BOLTON. I agree with you. I deal with you wholeheartedly. And so what we have done is we have started to put together our plans as to what we are going to do with the work force. Part of that involves recruiting. Part of that involves shaping the work force to allow folks to retire early so I can bring other folks in. Part of it is bring new tools and processes in—

Mr. ABERCROMBIE. But are you going to be able to retain those positions?

Secretary BOLTON. That is precisely what I am talking about. How do I go about doing that? And that is part of the planning. Part of that requires resources, ie, money. Part of that just requires policy change, which we are working on.

The Department is also looking at this, and that is the OSD part of this. And are very concerned about this and are actually proposing legislation to help in some areas.

So this is not an effort just to the Army.

Mr. ABERCROMBIE. Well, I will not carry it on, excuse me Mr. Bolton, because our time is precious.

Secretary BOLTON. Yes, sir.



Mr. ABERCROMBIE. I will not carry it on, but the information that I have been getting or this committee has been getting is that the Pentagon is intent about carrying out this A-76 and all of the rest of these operations that are—expect to decimate the civilian work force of the military.

Secretary BOLTON. Well, I—

Mr. ABERCROMBIE. I do not know what planning you are talking about.

Secretary BOLTON. I am talking about my planning for the acquisition work force of the Army.

Mr. ABERCROMBIE. What you would like to see.

Secretary BOLTON. What I would like to see and then I will push that through our processes to our leadership and on to OSD.

Mr. ABERCROMBIE. Okay, so I have not—the bad things are almost—Dr. Lamartin's fault. I got it. [Laughter.]

Secretary BOLTON. Well, I would never say that, not to my good friend.

Dr. LAMARTIN. Nor would I, sir. What I would say that my responsibly extends only across defense systems. And we have—

Mr. ABERCROMBIE. Well, you got my point.

Dr. LAMARTIN. Absolutely.

Mr. ABERCROMBIE. I will not carry it further, Mr. Chairman. I appreciate your indulgence. But I want—I am a very strong advocate of having an institutional civilian work force responsible to and experienced in what is necessary to do the work for the United States military. Not outside contract employees coming in whose loyalty let alone whose competence in my judgment is open to question.

General KERN. Mr. Abercrombie if I could just add a comment. I would like to submit this chart for the record.

Mr. ABERCROMBIE. It looks like diamond head from here. [Laughter.]

General KERN. I wish it were. It is the demographics of the Army Materiel Command civilian work force. And what you can see between the shift and the O and the blue peaks is the age differential, but the alarming part is this number of few people that we have that are going to be the new work force for the 21st century. And I met with a—in fact Dr. Chu from OSD personnel yesterday to talk about that and the number of interns. And we have talked with the Army about it. I think it is a critical effort that we all need to work hard to make sure that we do have a 21st century work force.

Mr. ABERCROMBIE. Thank you.

Mr. WELDON. Does that mean the gentleman is reconsidering his position on the A-76? [Laughter.]

The gentleman from South Carolina is recognized.

Mr. WILSON. Thank you, Mr. Chairman.

Again, I want to thank the four of you. You are educating a relatively new Member of Congress. And it means a lot to me. I was particularly interested in General Magnus's point about the Penn State Marine training facility. I was impressed to learn that the stryker brigade with the National Guard is going to Pennsylvania.

General MAGNUS. Yes, sir.



Mr. WILSON. I am reminded constantly of the very effective congressional delegation from Pennsylvania. I have no further questions. [Laughter.]

Mr. WELDON. Give me a list of your plus ups for this year. [Laughter.]

Mr. WILSON. And I do want to point out that, Joe Magnus, we do have some room at Paris Island for additional facilities.

General MAGNUS. I thought you were full down there.

Mr. WILSON. No, no, no. It is a great place to live.

Mr. WELDON. I thank the gentleman for his comments and for his insightful questioning on the issues. And I thank my distinguished friend, Mr. Abercrombie. And we thank each of you for both the vision you provided for us and the leadership you are providing for us during these very difficult times.

As I said at the beginning, our thoughts are with our troops that you have so very capably trained and prepared while they serve in harm's way right now.

And I will reiterate our commitment to work with you. We want to see you accomplish the objectives. We just have to make sure that we have the dollars on the table, that we can justify the expenditures, that we do not let corporate America run away with programs that we then have to go back and try to fix, but rather that we work along constructively and will provide the resources as we have consistently to make sure that you have those extra dollars that are not in the president's budget request.

So we thank you all, and this hearing now stands adjourned.

[Whereupon, at 4:00 p.m., the subcommittee was adjourned.]

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# **A P P E N D I X**

MARCH 20, 2003

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**PREPARED STATEMENTS SUBMITTED FOR THE RECORD**

MARCH 20, 2003

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**Statement of the Honorable Curt Weldon  
Chairman, Subcommittee on Tactical Air and Land  
Forces**

**Army and Marine Corps Ground Forces Requirements  
and Current and Future Industrial Base Hearing**

**March 20, 2003**

This morning the Tactical Air and Land Forces Subcommittee meets to receive testimony from Department of Defense, Army and Marine Corps witnesses on the breadth of DOD's current ground force weapon programs and the industrial base that supports those platforms. The witnesses will also address the technologies and industrial base required to field the Army's Future Combat Systems (FCS) and meet next generation Marine Corps ground equipment requirements.

This hearing was scheduled in February, however, it has particular significance today with 69,000 soldiers and 80,000 Marines engaged in [combat] operations along with Navy, Air Force and coalition forces in both Afghanistan and Iraq. These personnel comprise the full spectrum of U.S. ground forces including special operations units, light and airborne infantry,

heavy armored forces and Marine Corps expeditionary units. We have no control over how things will evolve in either of these theaters of operations, but we do want to express our deepest respect and appreciation to our men and women and supporting personnel for their service to the nation and offer our "God speed" in their mission.

All of the major weapon systems employed by Army and Marine Corps ground forces today were originally fielded in the early to mid-eighties. However, many of these systems have received at least one, if not several upgrades through technology insertions in order to address evolving threats.

As we review our ground forces, today's Army is comprised of a light infantry and heavy armored force mix. The heavy force is centered around the M1 Abrams tank and the Bradley Fighting Vehicle, currently the most sophisticated and superior armored fighting vehicles in the world, and originally designed to go toe-to-toe with the best heavy armored vehicles built by the former Soviet Union during the Cold War. Major upgrades to these vehicles have enhanced the original analog variants with state-of-the-art digital command and control technologies and thermal sights.

A gap between the light infantry and heavy forces was identified by the Army after the Gulf War. The Army determined that a more lethal, deployable, and sustainable combat force was required to enhance its capability to respond to a broad spectrum of threats and operations. To bridge this gap, the Army is currently fielding an interim force comprised of medium armored vehicles centered around the Stryker brigade combat teams. The fiscal year 2004 budget request includes \$1.2 billion for a fourth of six planned Stryker brigades.

The Army transformation plan also includes a long-term acquisition strategy to field what it refers to as the “21<sup>st</sup> Century Army,” much of which entails the Future Combat Systems -- FCS. The magnitude of the requirements that have been articulated, the process for carrying it to fruition, the attendant costs, and the time required to do so raise many questions, all of which are our responsibility to address.

The Objective Force, of which the FCS is a major component, is one of the three major pillars of Army transformation – the other two being the Legacy Force and the Interim Force.

The Army has requested \$1.7 billion to continue developing its FCS in FY 2004, a networked "system of 19 separate systems". The Army has laid out a very ambitious plan to achieve first unit equipage for FCS in FY 2008 and to attain an initial operational capability by FY 2010.

Trying to fulfill all these requirements simultaneously, means the Army must:

- Maintain its current light and heavy legacy force in some state of readiness;
- Field interim, medium armored brigades; and
- reprioritize procurement funds in its FY 2004 request from the termination of 24 current programs and the deferment or restructuring of 24 additional programs for research and development to accelerate the FCS.

As a result, the Subcommittee Members must be confident that the Army, in its best efforts to transform as rapidly as possible with limited resources, has made the right decisions in what appear to be high risk trade offs in its FY 2004 request and through the future years defense program. There is some concern that the Army may be taking far greater near term risk than may be prudent or warranted.



The total of 48 terminated and restructured programs in FY 2004 are in addition to the 18 programs that were terminated in the FY 2003 budget to afford transformation requirements, which I might add, this committee fully supported the Army on last year.

The 2004 request may present more risk than the American public is comfortable with, which also includes termination, earlier than planned, of both of its heavy armored vehicle upgrade programs. As a result, the Army now plans to only field two digitized divisions versus the Army's original plan of fielding three and one third digitized divisions. A large amount of the funds that was originally planned to be requested for these terminated and restructured programs in FY 2004, was reprioritized in order to fund FCS in FY 2004.

Consequently, since the Army buys the majority of heavy ground vehicles within DOD, the decision to terminate the Abrams and Bradley upgrade programs early, may have both industrial base and affordability implications for FCS and next generation Marine Corps armored vehicle programs as well.

Accordingly, I am concerned that there may not be an adequate industrial base to transform in order to produce whatever

type of FCS ground vehicle requirement emerges over the next several years. Therefore, we're interested in hearing today what analysis the Department of Defense has done in its decision to endorse the Army program.

It is noteworthy to mention that there is much skepticism even within DOD on the achievability of Army FCS goals. The Department's own Director of Operational Test and Evaluation has highlighted in his recent annual report; and I quote, "It is highly unlikely that the current schedule for FCS development can be maintained to field threshold levels of mission performance due to the high levels of technological and operational risk. The FCS Block I development schedule calls for a series of limited user tests in FY 2004, yet the government asked industry to prepare proposals in April 2002, and there are currently no vehicles, test beds, prototypes, or even mature operational concepts to test...Survivability will depend upon quantum leap improvements." (unquote)

Further, press accounts this week of FCS program briefs to Secretary Rumsfeld, indicate he questioned nearly every aspect of the Objective Force. The report indicated that Secretary Rumsfeld "suggested" that the Army establish an independent panel to

conduct a 30- to 60-day Institute for Defense Analyses assessment of the Objective Force and FCS.

The DOT&E report and accounts of the Army briefing to Secretary Rumsfeld do not provide the confidence we require to commit today to \$1.7 billion in spending for an aggressive time schedule for fielding FCS.

We all have numerous questions today about what has changed in the DOD requirements, development and acquisition process to make it possible to field some undefined, uncosted number of a family of systems simultaneously by FY 2008 to obtain an initial operational capability of FY 2010. While I am extremely hopeful that we could rapidly accelerate a group of technologies and break the current 10 to 20 year acquisition cycles for complex systems, there is reason for concern given the poor track record of fielding even individual complex programs such as Comanche and Land Warrior.

To get a better handle on these complex and difficult issues today, we are pleased to have:

a) The Honorable Claude M. Bolton

Assistant Secretary of the Army  
Acquisition, Logistics and Technology;

b) General Paul \_\_. Kern,  
Commander, Army Material Command;

c) Lieutenant General Robert Magnus,  
Deputy Commandant of the Marine Corps for  
Programs and Resources;

and,

d) Dr. Glenn F. Lamartin,  
Director of Strategic and Tactical Systems,  
Office of the Under Secretary of Defense for  
Acquisition, Technology, and Logistics.

I would now like to recognize the gentleman from  
Hawaii and my good friend, Neil Abercrombie, for any remarks he  
would like to add.

(Back from Abercrombie)

Before we begin, without objection, all witnesses' written testimony will be accepted for the record.

Secretary Bolton, the floor is yours.



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HOUSE COMMITTEE  
ON ARMED SERVICES**

**TESTIMONY OF**

**DR. GLENN F. LAMARTIN**

**DIRECTOR, DEFENSE SYSTEMS**

**OFFICE OF THE UNDER SECRETARY OF DEFENSE**

**(ACQUISITION, TECHNOLOGY AND LOGISTICS)**

**BEFORE THE UNITED STATES HOUSE**

**COMMITTEE ON ARMED SERVICES**

**SUBCOMMITTEE ON TACTICAL AIR AND**

**LAND FORCES**

**March 20, 2003**

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ON ARMED SERVICES**

**STATEMENT OF  
DR. GLENN F. LAMARTIN  
DIRECTOR, DEFENSE SYSTEMS  
OFFICE OF THE UNDER SECRETARY OF DEFENSE  
(ACQUISITION, TECHNOLOGY AND LOGISTICS)**

**BEFORE THE HOUSE ARMED SERVICES COMMITTEE  
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES**

**MARCH 20, 2003**

**INTRODUCTION**

Good morning Mr. Chairman, Mr. Skelton, and Members of the Committee.

Thank you for the opportunity to express the Department's views on how changes in our acquisition policies will expedite fielding of the Future Combat Systems and on the current and future ability of the U.S. industrial base to effectively and affordably meet our national security requirements for Army and Marine Corps ground weapon systems and ammunition. I am pleased to provide you this report on the Department's progress in these areas.

**ACQUISITION PROCESS CHANGES AND THE FUTURE COMBAT  
SYSTEM**

The Department is in the process of reissuing the DoD 5000-series documents that guide our acquisition activities. The Under Secretary of Defense for Acquisition, Technology and Logistics is scheduled to testify on these exciting changes before

the full House Armed Services Committee next month. Among the changes being considered are to:

- (a) implement evolutionary acquisition to rapidly deliver capability to warfighters with the explicit intent of improving that capability in the future
- (b) encourage tailoring of our acquisition programs to promote flexibility while retaining a knowledge- and event-based approach
- (c) decentralize responsibility so as to provide Program Managers the authority they need to execute their programs, and
- (d) foster innovation, learning, and continuous improvement.

My role, as the Director of Defense Systems, includes overseeing for the Defense Acquisition Executive, how acquisition programs, such as the Army's Future Combat Systems, implement these important changes in our acquisition process, seeing to the proper application of sound management and engineering practices, and in doing so helping to ensure their success.

## **FUTURE COMBAT SYSTEMS ACQUISITION**

The Future Combat Systems (FCS) is a prime example of the Department's efforts to encourage in its acquisition activities a creative and informed risk-taking culture to better provide future warfighters the capabilities they will need to deter aggression or fight and win our nation's conflicts in both joint and coalition environments. The Army began a transformation a few years ago that will result

in an Objective Force capable of defeating all adversaries, in all situations, from peacetime military engagements to major combat operations. The fundamental enabler of this Objective Force is the FCS.

The FCS is not a single system. Rather, it is an ensemble of combat and support vehicles, and unmanned air and ground systems designed from the outset to work together as an integrated system-of-systems. FCS relies on advanced communications, sensors, and battle command systems. Its program structure fully embraces the evolutionary acquisition approach by planning to add capability in development spirals. An open architecture will make this possible by allowing insertion of maturing technologies. Development and fielding of FCS is an aggressive, challenging endeavor that requires many parallel activities to achieve a First Unit Equipped, or FUE, in 2008. As a minimum, this first introduction must include the networked, information framework that is the foundation of the FCS vision and, if executed properly, can be the basis for continuing spiral development. The Army plans an Initial Operational Capability, or IOC, around 2010. The Department has scheduled a Milestone B, System Development and Demonstration, decision in May of this year. As such, Secretary Aldridge, the Defense Acquisition Executive, has not yet approved the details of the program structure and approach.

We are now taking a number of steps to help prepare for this major review and answer the many questions we have about successfully executing this complex system-of-systems acquisition. We are carefully reviewing the program and the challenges we face at three basic levels: 1) the FCS as a family of systems, 2) the FCS as a key element of the Army's Objective Force together with the many complementary systems with which it must interact to be effective, and 3) FCS in the context of a land component of a Joint Force. We plan a series of Defense Acquisition Board reviews in the months leading up to and culminating in the Milestone B decision in late May.

#### **Future Combat Systems Acceleration Challenges**

Attaining the Future Combat Systems schedule to an FUE in 2008 and an IOC in 2010 will require the Department to develop and demonstrate a number of technologies that are critical to providing advanced capabilities. To help meet this challenge, the Army has partnered with the Defense Advanced Research Projects Agency (DARPA) to develop Future Combat Systems concepts and identify those technologies and systems with the most promise. The Army - DARPA partnership is providing payoff technologies in unmanned air systems, unmanned ground systems, communications, and sensors, and they have already contracted with a lead systems integrator to speed up the transition into development. The Army has also focused much of its Science and Technology investment to advance the technologies needed for the Objective Force and the Future Combat Systems.



The Department's acquisition community will transform its actions, in part, through informed risk-taking. As such, the Army's process for managing FCS program risks includes identifying and taking steps to mitigate the risks associated with technology maturation. In one of the DAB sessions I alluded to earlier, Secretary Aldridge will review the maturity of the FCS-related technologies and the remaining risk we must resolve in development. That review will be a critical component of his decision regarding proceeding into System Development and Demonstration. Our intent is for all critical technologies to be sufficiently mature before integration into the Future Combat Systems design, thereby reducing the amount of time, effort, and risk associated with demonstrating a capability.

The Committee's letter of invitation noted the Director of Operational Test and Evaluation's concerns about the ability of the Future Combat Systems program to meet its schedule for threshold levels of mission performance. The Department acknowledges that the FCS schedule is ambitious, and concerns about the program's ability to hold that schedule will be thoroughly addressed during the Defense Acquisition Board's deliberations on the Milestone B decision. To that end, my office is leading a detailed review of the Army's plans for program management and systems engineering as part of the preparation for the Milestone B review. The Department's staff is also planning for test and evaluation, assessing technology readiness levels, developing an independent cost estimate,

reviewing the acquisition strategy, assessing needed industrial capability, and looking hard at logistics and support matters. These are typical Milestone B activities that, in this case, will consider the special nature of the FCS program. Together, these activities will address many of the concerns raised by the Director of Operational Test and Evaluation and assure an informed decision about proceeding into the next program phase.

### **Industrial Base Considerations and FCS**

The Department has had to make difficult choices as it weighs operational risks and balances its investments in today's forces with the steps it must take to transform to meet future needs. These choices about recapitalization, modernization, and the acquisition of new capability can have implications for the industrial base. The Department recognizes that some of its decisions regarding FCS and other weapons systems can impact the industrial base. For example, the shift from heavy armor-plated vehicles to lighter, more deployable vehicles built of composite materials and specialty metals will challenge the industrial base to respond with new manufacturing technologies and processes. To help address this, the Army recently approved the teaming of the two legacy ground vehicle producers for development of the manned-systems portion of the FCS. Therefore, for ground combat vehicles related to FCS, we are confident that there are adequate opportunities for our current defense industry to contribute now in

design, development, and integration activities, and to prepare to meet our future production and support needs.

Although the Department believes that forces in the market are positive and that industrial capabilities will be available when needed for combat vehicles, we will actively monitor the base. One of our monitoring efforts will be an Army-led in-depth industrial base assessment that will cover the entire ground combat vehicle industrial sector. This initiative should be completed by the end of this year. In addition, the Army has started an industrial capabilities assessment that will address all aspects of the FCS program. This will be a continuing effort that will assess the industrial capabilities needed to design, develop, produce, and support the Future Combat Systems; and it will surface any issues it finds for management attention.

## **CONCLUSION**

The Department is excited about the transformational capabilities that the Future Combat Systems will bring to the battlefield. We believe the changes in our acquisition processes are well matched to the new environment in which we find ourselves. The Department looks forward to the challenges before us.

Thank you for this opportunity to testify before the Committee on these important topics. I will be happy to answer any questions you might have.

**STATEMENT BY**

**THE HONORABLE CLAUDE M. BOLTON, JR.  
ASSISTANT SECRETARY OF THE ARMY  
(ACQUISITION, LOGISTICS AND TECHNOLOGY) AND  
ARMY ACQUISITION EXECUTIVE**

**AND**

**GENERAL PAUL J. KERN  
COMMANDING GENERAL  
ARMY MATERIEL COMMAND**

**BEFORE THE**

**SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES**

**COMMITTEE ON ARMED SERVICES**

**UNITED STATES HOUSE OF REPRESENTATIVES**

**FIRST SESSION, 108TH CONGRESS**

**ON THE FISCAL YEAR 2004 BUDGET REQUEST AND  
ARMY GROUND COMBAT, COMBAT SUPPORT, AND AMMUNITION  
PROCUREMENT PROGRAMS AND FUTURE TECHNOLOGY INITIATIVES**

**MARCH 20, 2003**

**NOT FOR PUBLICATION  
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ARMED SERVICES  
UNITED STATES HOUSE  
OF REPRESENTATIVES**

**STATEMENT BY  
THE HONORABLE CLAUDE M. BOLTON, JR. AND  
GENERAL PAUL J. KERN**

**ON THE FISCAL YEAR 2004 BUDGET REQUEST AND  
ARMY GROUND COMBAT, COMBAT SUPPORT, AND AMMUNITION  
PROCUREMENT PROGRAMS AND FUTURE TECHNOLOGY INITIATIVES**

**INTRODUCTION**

Mr. Chairman and distinguished members of the subcommittee, thank you for this opportunity to report to you on the Fiscal Year 2004 budget request and the Army's ground combat, combat support, and ammunition procurement programs and future technology initiatives. It is our privilege to represent the Army leadership, the military and civilian members of the Army acquisition workforce, and the soldiers who rely on us to provide them with world-class weapons and equipment so they can successfully accomplish any mission at anytime, anywhere in the world.

We thank members of this subcommittee for your strong support for the Army. This is a time of tremendous change within the Army, and we are most grateful for your wisdom and guidance. With your help, we will remain the most respected landpower to our friends and allies and the most feared ground force to those who would threaten the interests of the United States. Your continued advice and support are vital to our continued success.

In October 1999, the Army unveiled its vision for the future – “Soldiers, on point for the Nation, transforming this, the most respected army in the world, into a strategically responsive force that is dominant across the full spectrum of operations.” The attacks against our Nation on September 11, 2001, and the ensuing war on terrorism, validate The Army’s Vision – *People, Readiness,*



*Transformation* – and our efforts to change quickly into a more responsive, deployable, agile, versatile, lethal, survivable, and sustainable force.

## **ARMY TRANSFORMATION**

The Army Transformation is advancing along three major axes towards attainment of the Objective Force. We selectively recapitalize and modernize today's capabilities to extend our overmatch in staying ready to defend our homeland, keep the peace in areas important to the Nation, and win the war against global terrorism. Stryker Brigade Combat Teams – our Interim Force – will bridge the current operational gap between our rapidly-deployable light forces and our later-arriving heavy forces, paving the way for the arrival of the Objective Force. By 2010, The Army's Objective Force – organized, equipped, and trained for ground dominance, cyber-warfare, and space exploitation – will provide the Nation the capabilities it must have to remain the global leader, the strongest economy in the world, and the most respected and feared military force.

In order to deliver to our soldiers the right capabilities at the right time, right place, and the right price, we are focusing our efforts in four key areas: Programs, People, Production, and Improvement.

## **PROGRAMS**

The acquisition process must begin with a solid statement of requirements. The key body associated with determining those requirements is the Joint Requirements Oversight Council (JROC). The JROC is an advisory council to the Chairman of the Joint Chiefs of Staff (CJCS). In this capacity, the JROC reviews all warfighting deficiencies that may necessitate major defense acquisition programs and validates that such deficiencies cannot be satisfied by non-materiel means, e.g., changes in doctrine, tactics, training, or organization. Additionally, the JROC assists the CJCS in identifying and assessing the priority

of joint military requirements, among existing and future major acquisition programs, to meet the National Military Strategy (NMS). The JROC ensures that the assignment of such priorities conforms to and reflects resource levels as projected by the Secretary of Defense through the Defense Planning Guidance. At the CJCS's direction, the JROC also evaluates alternatives to satisfying warfighting requirements by comparing the cost, schedule, and performance criteria of selected programs and identified alternatives.

To accomplish these tasks, the JROC oversees a Joint Capabilities Integration and Determination System (formerly Requirements Generation System) which standardizes the analysis required for mission-need determination, validation, and approval prior to start of the acquisition process. The JROC ensures that emerging performance objectives and thresholds adequately address the warfighting mission need and that the delivered capability and timing of that delivery are linked to the NMS.

JROC actions on ground combat programs in the last three years include: on February 23, 2000, the JROC approved the Mission Need Statement, approved the Operational Requirements Document, and validated the Key Performance Parameters for the Stryker; on January 23, 2003, the JROC approved the Future Combat Systems Mission Need Statement.

Today's Army – our **Legacy Force** – guarantees both current warfighting readiness as well as the ability to transform successfully to the Objective Force. This will remain the case for the next 15 years as the Army begins fielding the Objective Force units by the end of this decade and gradually transfers the mantle of readiness responsibility to these new units of action. In order to preserve adequate operational readiness during this period, the Army must continue to invest sufficiently in its current force through a program of recapitalization and selective modernization. These constrained investments are essential in order to ensure that the Army still retains military superiority during

the Transformation process and likewise, reduces the increase in operating and support costs associated with aging weapon systems.

The Army is recapitalizing and selectively modernizing a portion of the current force, including the following programs:

The Abrams tank provides mobile protected firepower for battlefield superiority. The Abrams tank closes with and destroys enemy forces on the integrated battlefield using mobility, firepower, and shock effect. The 120mm main gun on the M1A1 and M1A2, combined with the powerful 1500 horsepower engine and special armor, make the Abrams tank particularly suitable for attacking or defending against large concentrations of heavy armor forces on a highly lethal battlefield. Features of the M1A1 modernization program include increased armor protection; suspension improvements; and a nuclear, biological, and chemical protection system that increases survivability in a contaminated environment. A modification consisting of an integrated appliqué computer and a far-target-designation capability can be incorporated on the tank.

The M1A2 modernization program includes a commander's independent thermal viewer, an improved commander's weapon station, position navigation equipment, a distributed data and power architecture, an embedded diagnostic system and improved fire control system. The M1A2 System Enhancement Program (SEP) adds second-generation thermal sensors and a thermal management system. The SEP includes upgrades to processors/memory that enable the M1A2 to use the Army's common command and control software, enabling the rapid transfer of digital situational data and overlays. The Abrams modernization strategy also includes a new engine program, the Abrams Integrated Management (AIM) Overhaul Program, and parts obsolescence program, which will reduce the operational and support costs and logistical footprint associated with the Abrams.

In FY03, M1A2 SEP production continues. The Army's M1A2 SEP fleet requirement is 588 vehicles. In FY03 the fielding of M1A2SEPs to 1<sup>st</sup> Cavalry Division in Fort Hood, Texas, continues.

Abrams and Bradley fight as a team, and the mission is to maintain combat overmatch. The Bradley fighting vehicle is being upgraded to provide infantry (M2A3) and cavalry (M3A3) fighting vehicles with digital command and control capabilities, as well as significantly increased situational awareness, enhanced lethality, survivability, and improved sustainability and supportability.

The Bradley M3A3 is a significant step forward for the infantry force because it is the first version of the Bradley that will be technologically equal to the Abrams M1A2 SEP tank. Some of the enhanced capabilities of the A3 include: digital command and control; Second Generation Forward Looking Infrared; Commander's Independent Viewer, Squad Leader's Display; Improved Bradley Acquisition Systems; and an integrated position navigation system.

The Army's recapitalization and selective modernization of the Legacy Force focuses primarily on those systems that will not only benefit the warfighter today, but will have a direct applicability to the Objective Force over the longer term. Modernization has two major components:

The first component is those systems that are a part of the near-term Legacy Force and will transition to the Objective Force, such as the Family of Medium Tactical Vehicles (FMTV). FMTV is a family of diesel-powered trucks in the 2-½ ton and 5 ton payload classes to modernize and improve the existing medium vehicle fleet. The second component is the systems being built specifically for the Objective Force but that can be employed today such as the Tactical Unmanned Aerial Vehicles, which the Army's Program Executive Officer for Aviation, Major General Joseph L. Bergantz, covered in his testimony to this subcommittee last week.

Ultimately, the Army will have a common organizational design for all components – Active, Guard, and Reserve – built around a new generation of systems that are deployable on C-130-like aircraft, with optimum development on C-17 aircraft and fast sealift. The result will be a more strategically responsive Army that is more capable of dominance along the full spectrum of military operations.

The **Interim Force** is based on the foundation of Stryker Brigade Combat Teams (SBCT) equipped with a family of Stryker armored vehicles, lightweight artillery, and other available advanced technology. This technology will include Land Warrior Soldier Systems that will be integrated into SBCTs and significantly enhance the common situational awareness for soldiers.

Stryker provides the primary combat and combat support platform of SBCTs to enable a strategically deployable (C-17/C-5) and operationally deployable (C-130) brigade capable of rapid movement anywhere on the globe in a combat-ready configuration. Stryker supports the Army Vision and Transformation and fulfills an immediate requirement with equipment that is highly deployable, lethal, survivable, mobile, and reliable.

The Stryker family of vehicles consists of two variants: the Infantry Carrier Vehicle (ICV) and the Mobile Gun System (MGS). The ICV is a troop transport vehicle capable of carrying nine infantry soldiers, their equipment, and a crew of two consisting of a driver and vehicle commander. The MGS is designed to support infantry. It incorporates a 105mm turreted gun and autoloader system designed to defeat bunkers and breach double-reinforced concrete walls. There are eight other configurations based on the ICV that provide combat and combat support capabilities. These are the Reconnaissance Vehicle (RV), Mortar Carrier (MC), Commander's Vehicle (CV), Fire Support Vehicle (FSV), Engineer Squad Vehicle (ESV), Medical Evacuation Vehicle (MEV), Anti-Tank Guided Missile



vehicle (ATGM), and Nuclear, Biological and Chemical Reconnaissance Vehicle (NBCRV).

Each SBCT requires 330 Strykers. The current program acquires 2,121 Strykers to field six SBCTs, one of which will be configured as a cavalry regiment. The first SBCT at Fort Lewis, Washington, will achieve initial operational capability in the third quarter of Fiscal Year 2003.

The **Objective Force** is the Army's main effort and ultimate Transformation goal. It is the future force that will achieve the characteristics described in the Army Vision – responsiveness, agility, deployability, versatility, lethality, survivability, and sustainability – and will be capable of dominating at every point of the spectrum of operations. The key to Transformation to the Objective Force is the Future Combat Systems (FCS). FCS, the Army's top priority S&T program, will be a multi-functional, multi-mission, reconfigurable system-of-systems designed to maximize joint interoperability; strategic and tactical transportability; and integration of mission capabilities, including direct and indirect fire, reconnaissance, troop transport, countermobility, nonlethal effects and secure, reliable communications. FCS will provide these advanced warfighting capabilities while significantly reducing logistics demands.

Approximately one-third of the Army's S&T investment is focused on technologies for FCS. The S&T program has been shaped to pursue future technology options for FCS with the capability to incorporate, over time, these advances through spiral developments. The initial version of FCS will be designed to provide certain threshold capabilities. Subsequent versions will have increased functionality to achieve Objective Force full spectrum capabilities. Operational versatility will be realized using an open-architecture system concept, with a design approach that can be readily upgraded and tailored to enable the system-of-systems to perform different missions as needed.

Other systems of critical importance to the Objective Force include the RAH-66 Comanche helicopter, the Joint Tactical Radio System (JTRS), and the Warfighter Information Network – Tactical (WIN-T). As Major General Bergantz told this subcommittee last week, Comanche is a multi-role helicopter for the Objective Force that will be capable of executing a range of missions in support of close combat, vertical maneuver, and mobile strike operations. JTRS is the next generation tactical radio that will provide secure, multi-band, multi-mode software programmable digital radios for the electronic transport of emerging and anticipated warfighter command and control requirements. WIN-T is the integrated high-speed and high capacity communications network for the Objective Force. FCS, Joint Tactical Radio System, satellite terminals and other Department of Defense (DoD) Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance (C4ISR) programs will rely on WIN-T for seamless integration into the DoD Global Information Grid.

## PEOPLE

Within the next two to four years, 50 percent of the Army acquisition workforce will be eligible to retire. About one-third of the Army's civilian population is eligible for retirement today. The skills and abilities that the Army will need to replace this aging workforce are very different from the mix of skills we currently have. In addition, a dozen years of downsizing the Army's civilian workforce has created huge gaps in selected occupational sectors that cannot be filled easily.

It is inevitable that our future workforce will be smaller. Our goal is to design an acquisition workforce that will, with fewer people, continue to provide our soldiers with world-class weapon systems and equipment. We will always need a smart, motivated work force that operates in a continuous learning environment. Competition for the most talented people – many with hard science degrees and other high credentials – will be especially keen.

## PRODUCTION

The health of the defense industrial base is key to the Army's ability to continue to provide innovative technology and technologically excellent systems and equipment at favorable and competitive prices. Production is primarily dependent on the privately-owned network of prime contractors and subcontractors. The Army also retains a few industrial facilities that are owned and sometimes operated by Army civilians, e.g., our ammunition plants and arsenals. We would like to highlight some of the critical issues affecting the Army today.

The major issue is limited contractor competition and overhead rate increases. Business for primes has been dwindling as we bought fewer systems over the past five years and instead focused on the modifications. Modifying existing systems and equipment usually involves a sole source negotiation with the original equipment manufacturer. Our options are limited because we cannot afford to miss out on important advancements or risk losing industrial suppliers critical to sustainment of our fielded systems. The result is that programs are being faced with increased costs and limited competition. At the same time, the industry is consolidating. We have a few very large prime contractors who sometimes also buy critical subcontractors. We encourage competition during acquisition planning to the maximum extent possible. To guard against over consolidation, we review proposed mergers and acquisitions as part of the governments antitrust review process, led by the Department of Justice and the Federal Trade Commission.

Another concern is availability of obsolescent parts, primarily within legacy systems. This is aggravated by limiting the use of military specifications and standards in favor of a greater reliance on commercial items. However, the rapid and constant change in commercial technology has accelerated obsolescence

problems in several systems when viewed from the life cycle of a major weapon system. Development efforts must anticipate and include provisions for planned technology upgrades, therein requiring a continual infusion of research and development funding into fielded systems. Production planning must include some degree of life buys and obsolete component replacements.

Another concern is lower production levels. At lower volumes of production/remanufacturing, the manufacturer cannot effectively maintain a large work force. This usually results in many older workers retiring as production staff decreases. With this, we lose their skills and the available work force is challenged in its ability to meet priority surge production.

It is clear that the defense industrial base of the 21<sup>st</sup> Century will consist of a complementary and synergistic mix of private sector and government capabilities. By leveraging the private sector's capabilities to the maximum extent practicable and economical, the Army will focus its resources on those manufacturing processes and products unique to the national security mission. The challenge is to determine what organic capability to retain and the most efficient organic capacity.

The Army recognizes the need for transformation of the organic industrial base and has directed the implementation of initiatives to improve efficiencies and maximize utilization. One of the most promising approaches to fuller utilization of the organic base is through public-private partnerships.

The current Army organic industrial base consists of facilities that produce ammunition, manufacture components, and maintain equipment. The facilities, located throughout the continental United States, consist of Government-Owned, Government Operated (GOGO) and Government-Owned, Contractor Operated (GOCO) facilities. The Army owns all of these facilities; however, Army

employees manage and operate the GOGOs. Private companies manage and operate the GOCOs.

**GOCO and GOGO ammunition facilities:** At these facilities, the Army produces, loads, assembles, and packs the various calibers of conventional ammunition such as small arms, mortar, and tank rounds used by all the military services.

**GOGO weapons manufacturing arsenals:** Rock Island and Watervliet produce items such as gun tubes, gun mounts, and other armament components for the Army, Navy, and Marine Corps, as well as Foreign Military Sales.

**GOGO maintenance depots repair:** These five facilities overhaul, upgrade and maintain helicopters, missiles, combat vehicles, tactical vehicles, and communication and electronic equipment for all the Services and other countries, as well.

The Army has undertaken initiatives to maximize utilization of organic plant capacity and to improve efficiencies. Regarding the GOGO and GOCO ammunition facilities, the Army is moving to right size the capacity. The strategy addresses integration and consolidation, divestiture, leasing arrangements as appropriate, and affordability.

Regarding the GOGO manufacturing arsenals, the Army determined that their integration into the Army's Ground Systems Industrial Enterprise (GSIE) initiative, along with ground support maintenance depots, is both feasible and viable.

Regarding the GOGO maintenance depots, the Army is committed to adhere to the statutory requirements for facilitating Army maintenance depots to meet core logistics requirements, establishing a more effective and efficient



depot level operation, enhancing productivity of its core capabilities, integrating innovative business processes, utilizing that facilitized capability, and fully supporting the partnership opportunities provided by designation of Army Centers of Industrial and Technical Excellence. The Army will continue to partner with the private sector and improve efficiencies.

## **IMPROVEMENT**

We must constantly work to improve conditions in all of the areas that we have discussed, and institutionalize our process improvements.

With each success, the real winner is the American soldier. We are here to serve the soldier on point for our Nation. We know firsthand that the most technologically advanced platforms – all the weapons in the world – are useless without the intellect, dedication, and remarkable sense of duty of our soldiers. They are the centerpiece of our formations. We all have an important role in the Army's transformation to the Objective Force. People will make it a success. People will make the difference. We will succeed as a team, and each of us has an important role.

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UNTIL RELEASED BY  
THE HOUSE ARMED  
SERVICES COMMITTEE

STATEMENT OF  
LIEUTENANT GENERAL ROBERT MAGNUS  
UNITED STATES MARINE CORPS  
DEPUTY COMMANDANT OF THE MARINE CORPS  
FOR PROGRAMS AND RESOURCES  
BEFORE THE  
HOUSE COMMITTEE ON ARMED SERVICES  
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES  
ON  
MARCH 20, 2003  
CONCERNING  
MARINE CORPS GROUND AND AMMUNITIONS PROCUREMENT  
AND FUTURE TECHNOLOGY INITIATIVES AND CONCERNS

NOT FOR PUBLICATION  
UNTIL RELEASED BY  
THE HOUSE ARMED  
SERVICES COMMITTEE

Mr. Chairman, distinguished members of the Committee; I am pleased to have this opportunity to discuss our major programs and the direction for the Marine Corps' future ground combat capabilities. But first, I would like to thank you for your continued support of our efforts as we seek to ensure our readiness as the Nation's expeditionary combined arms team while continuing the process to transform our forces to be ready for future challenges. Your committed efforts to improve the lethality, mobility, versatility and expeditionary sustainability of Marine Corps Air-Ground Task Forces are essential to our contributions for joint force capabilities as well as our interoperability with allied and coalition forces. The support provided by the Congress enables warfighting advancements that will ensure Marines are ready today, ready tomorrow, and the right force for the next fight.

## I. INTRODUCTION

The Navy-Marine Corps Team plays a key role in the global war on terrorism and in establishing stability and security in many of the world's trouble spots. Today, Marines, both Active and Reserve, are operating side-by-side with our Navy shipmates in diverse locations, at sea and ashore in austere expeditionary sites from Afghanistan, Kyrgyzstan, Uzbekistan, the Arabian Gulf, in the littorals, the Horn of Africa, the Georgian Republic, Colombia, Guantanamo Bay, and numerous other locations. At the same time, the Corps maintains rotational forward deployed Marine Expeditionary Units (Special Operations Capable) MEU(SOC), battalions and squadrons on unit deployment in Japan, squadrons integrated in Navy Carrier Aircraft Wings, and Anti-terrorism/Force Protection elements at U.S. embassies, consulates, embarked on Maritime Sealift Command controlled ships, and ready for missions as directed from our homeland bases. The powerful capability that the Navy-Marine Corps team brings to our joint forces is our contribution to the Nation's military power.

In 2002, the U.S. Marine Corps global activities, operating forward aboard naval ships and operating as part of an expanding joint force capability, reinforced tried and true operational concepts. Marine Corps operations highlighted the versatility and adaptability of the Marine Air Ground Task Force (MAGTF). Missions in support of OPERATION ENDURING FREEDOM (OEF) and NOBLE EAGLE (ONE) marked the most visible accomplishments of our forward-deployed forces. Early in 2002, Task Force 58 (TF 58), originally from its sea base in the North Arabian Sea, completed its mission in Afghanistan, and turned over operational control to the follow-on forces of the Army's 101st Airborne Division. The Marines and Sailors of Task Force

58 re-embarked aboard Navy amphibious combatants and completed their MEU(SOC) deployments. Since then, Marine Air Control Squadrons have continued to provide air control and surveillance support to OEF forces operating from Central and Southwest Asia expeditionary bases in the Central Command Area of Operational Responsibility. Elsewhere, the Marine Corps has continued to support Operation JOINT FORGE in the Balkans by providing Civil Affairs teams in support of the Stabilization Force (SFOR) Bosnia. Our aging KC-130 Hercules fleet, already heavily tasked by expeditionary operational support requirements elsewhere, augmented the Air Force's global combat search-and-rescue refueling mission with detachments from Turkey and Iceland. Marine Corps F/A-18 Hornet squadrons continue to operate from land bases in Kuwait and aircraft carriers in the Arabian Gulf in support of Operation Southern Watch, and supported OEF from austere bases in Kyrgyzstan. Additionally, our EA-6B Prowler squadrons continued to deploy to Japan, Turkey, and Saudi Arabia in support of joint force electronic attack operational requirements. MEU(SOC)s from the 1<sup>st</sup> Marine Expeditionary Force (I MEF) on the West Coast and 2<sup>nd</sup> MEF (II MEF) on the East Coast, as well as the 31<sup>st</sup> MEU(SOC) from 3<sup>rd</sup> MEF (III MEF) in Okinawa, reinforced the continuing importance of forward deployed responsiveness embarked on Navy Amphibious Ready Group combatants, prepositioned in key areas overseas, maintaining a tangible and effective demonstration of U.S. capabilities and commitments, while participating in numerous operations and exercises with our allies and friends.

Even as the Marine Corps saw one of our busiest years in terms of operational deployments, our participation in realistic, worldwide exercises remained critical to supporting the regional Combatant Commander's Theater Security Cooperation Plans, ensuring that we maintained a ready and capable force. Over the last year, Marines participated in more than 200 service, joint, and combined exercises. These included live fire, field training, command post, and computer-assisted exercises. Participants varied in size from small units to the Marine Expeditionary Forces. Overseas, MEUs(SOC) conducted exercises in Jordan, Italy, Croatia, Tunisia, the Philippines, Australia, Thailand, and Kuwait.

Marine Force Reserve units, which quickly answered the need to augment our forces overseas, were also designated as "on call" forces to support homeland security missions in Federal Emergency Management Agency regions. In addition, Reserve units in the operating forces also, provided Guantanamo Bay security forces, mobilized KC-130 and CH-53E

squadrons and ground combat and combat service support battalions, and conducted numerous training operations and internal exercises. With 19,557 Marine Reservists activated for current operations, Marine Forces Reserve demonstrated its complete integration into the total force every day. With over 13,400 Reservists deployed forward today, these Marines have seamlessly joined with their active duty counterparts to add flexibility and strategic depth to our force capabilities. Leaving civilian jobs and their families, their example of devoted, selfless service is a powerful testimony their patriotism and our motto *Semper Fidelis*.

The Marine Corps continues to contribute to the Nation's counter drug effort, participating in numerous counter-drug operations in support of Joint Task Force Six, Joint Interagency Task Force-East, and Joint Interagency Task Force-West. These missions are conducted in the Andean region of South America, along the U.S. Southwest border, and in several domestic "hot spots" that have been designated as High Intensity Drug Trafficking Areas. Individual Marines and task-organized units are assigned to these missions in order to provide support for domestic drug-law enforcement throughout the United States, and to provide conventional training to military forces in South America that execute counter-narcotics missions. Marine operational and intelligence teams also support Colombian military efforts to combat narco-terrorism. Marines of our reserve forces have executed the majority of these missions. As with all operations, there are hazards that are not eliminated by solid training of the Marines with good equipment. We were saddened by the loss of the Reserve AH-1W aircrew in an accident during Joint Task Force Six Counterdrug Support Mission.

Our efforts in these global operations and exercises have not been achieved alone. We have worked closely alongside the Navy, our sister services, and federal agencies to realize the true potential of joint, interoperable forces in the new national security environment of 21<sup>st</sup> century warfare. The superior operational and personnel readiness levels we have been able to achieve directly reflect the strong, sustained support of the Congress in last year's National Defense Authorization and Appropriations Acts and the recent Omnibus Appropriations. In Fiscal Year 2004, we seek your continued support for the President's Budget so we can maintain our readiness, improve and modernize our forces, and continue the process of transforming the Navy-Marine Corps Team.



## II. BUILDING ON SUCCESS

The President's FY2004 budget, together with your support, will provide a strong foundation on which we can continue building on our successes. Our focus is on excellence in warfighting and improving our capabilities as an agile, lethal, versatile, and scalable team for joint forces.

Challenges also arise from the changing realities and uncertain world security environment. Marines have always had an expeditionary mindset with "operational maneuver thinking" to ensure we are ready for the chaos of battle. The Marine Corps is committed to the idea that we will fight as an integral part of a joint team. We continue to place high priority on interoperability, shared concept development, and participation in joint exercises with our sister services. Additionally, the security environment now requires unprecedented attention to Homeland Defense and protection of our forces and critical infrastructure at home bases and stations to ensure we can deploy and sustain forces overseas. These challenges demand that we balance competing priorities while our focus of effort remains excellence in warfighting.

To meet regional and transnational challenges to the peace, stability, and security of our homeland and protect our overseas interests, the United States must maintain forces with full-spectrum capabilities to deter conflict, respond to crisis, assure our allies, and be ready to fight and win against any foe in the world's littorals. A critical requirement is the ability to project and sustain decisive military power in austere forward areas – more often than not, in the littorals of the world. With our access to land bases often an uncertain function of sovereignty issues, limited local infrastructure, force protection, and threat anti-access capabilities, versatile, sustainable, responsive, sea-based forces are critical to implementing U.S. strategy and policy.

Throughout history, sea-based, combat-ready Marine and Navy forces have made vital contributions, shaping global and regional security environments, assuring access to overseas regions, and facilitating rapid crisis response - **anytime, anywhere**, from the sea. By remaining ready in peacetime to engage in decisive combat throughout the range of options, the Navy-Marine Corps team plays a vital role in reassuring friends and allies, dissuading and deterring potential adversaries, ready and forward every day to provide U.S. national power from the sea.

## **THE MAGTF**

The Marine Corps has a long-standing, battle-proven commitment to combined-arms operations. Our extensive experience has caused us to form combined arms task forces closely integrating air, ground, and support units into a synergistic whole that is significantly more powerful than the sum of its parts. On a daily basis we train, exercise, and deploy as fully integrated combined-arms teams – Marine Air-Ground Task Force (MAGTFs). A MAGTF is composed of four elements that are scalable according to the mission: Command Element (CE); Ground Combat Element (GCE); Aviation Combat Element (ACE); Combat Service Support Element (CSSE). MAGTFs are equipped and trained to provide forward presence, to respond to crises, and when necessary, to fight and win, reaching from bases far at sea, through the littoral, to objectives deep inland. Combined-arms MAGTFs are readily scalable to meet challenges across the spectrum of conflict. Marine Expeditionary Forces (MEFs) are task-organized to fight and win decisively in major conflicts. Marine Expeditionary Brigades (MEBs) – the smallest MAGTF able to conduct sustained forcible-entry operations – are also task-organized to respond to a full range of contingencies, but are optimized for mid-sized and smaller operations. MEU(SOC)s are task-organized to provide a forward deployed, afloat presence and to be the first Marine Corps forces on the scene for most contingencies.

Reflecting their expeditionary character, task-organized MAGTFs operate around the world, providing a vital U.S. presence and combat capability. They participate in a wide range of operations, projecting U.S. power and influence from secure sea bases. Relying upon a combination of Navy amphibious lift, Maritime Prepositioning Ships, and strategic airlift, our expeditionary combined arm possess unmatched strategic mobility, providing joint force commanders with a full spectrum of capabilities wherever and whenever needed. They are drawn from both Active and Reserve Marines, demonstrating the responsiveness of the entire Marine Corps Total Force.

## **III. OUR MAIN EFFORT—EXCELLENCE IN WARFIGHTING**

The Marine Corps prides itself on its warrior spirit, an esprit de corps and expeditionary culture that bonds across generations of Marines and continues today. Regardless of their occupational specialty, all Marines, both male and female, active duty and reserve, know that the focus of our combined arms team is the infantryman, our most versatile weapon. Therefore,

starting with basic training and education to our officers and enlisted, every Marine knows the foundation of this spirit is the fact that every Marine is a rifleman. The Marine Corps reinforces this ethos through the common combat training of our ground and aviation related technical skills. Furthermore, the Marine Corps has re-invigorated this warrior spirit by recently increasing the length of Marine Combat Training for our new enlisted Marines, instituting the requirement for all Marines to achieve qualification in the Marine Corps Martial Arts Program, and improving the realism of our training exercises. Our marksmanship training is unrivaled. The addition of the Designated Marksman to the Marine Squad, the special duty assignments for our School Of Infantry instructors, the recent fielding of the new M-16A4, new Ontario rifle bayonet, all are intended to increase the warfighting capabilities of the individual Marine rifleman and the Marine Squad. We also focus on combat teamwork, striving to increase the cohesion of individual Marines within our battalions and squadrons. Consequently, the Warrior Spirit and teamwork is the key to our warfighting readiness.

### **Readiness**

Our vision of the future and our expeditionary culture, along with our philosophy of maneuver warfare, come together in our capstone concept, *Expeditionary Maneuver Warfare*. To fulfill this concept we must continuously balance our efforts to meet the competing demands of near-term readiness while ensuring the future warfighting readiness by investing in equipment modernization and infrastructure. This is critical to the Commandant of the Marine Corps and underlies our resource decisions. We have achieved this challenging balance in the President's budget. It requires careful tradeoff decisions to make the right balance, and we are utilizing numerous business practices to increase our operational effectiveness and provide efficient use of constrained resources. The Marine Corps now has the largest Activity-Based Costing/Management program in the Department of Defense. Our continuing efforts for efficient application of fiscal and manpower resources directly supported our commitment to individual, unit, and equipment readiness in the operating forces. The high tempo of recent operations and the scale of our operational deployments have increased the challenges as we execute the FY2003 budget and anticipate the future challenges in the GWOT. Your Marine Corps is meeting near-term readiness needs while we work to avoid tradeoffs that could negatively affect modernization and future readiness.

### **Modernization and Transformation**

One of our key themes in preparing our national military capabilities for 21st Century challenges is continuing our 227-year tradition of always preparing for the next fight and transformation. As the President explained in June 2002, "Our security will require transforming the military...[to] be ready to strike at a moment's notice in any dark corner of the world." The Marine Corps is embracing new organizational and operational concepts, while developing new uses of existing technology and capabilities to achieve a dramatic increase in performance for combine air-ground task forces. We are committed to enabling joint and combined operations, providing the capability to lead them when directed, in a dynamic, enhanced network environment.

This process of ensuring effective expeditionary capabilities is complex and demanding. It requires a thoroughgoing, deep-seated warfighting, expeditionary force development process and tough individual and unit training for routine operations in austere, and often-hostile operating environments. Marines are ready to operate in truly demanding locations, bringing expeditionary C2 and logistics with our combined arms task forces. The result has been and will continue to be fighting forces capable of operating for sustained periods in remote corners of the world, with a minimum of logistical "overhead." As we invest in technologies and systems, the Corps has consistently viewed transformation as an evolutionary process. We are currently working to adapt commercial off-the-shelf hardware and also on development of leap-ahead technologies like the MV-22 Osprey, Advanced Amphibious Assault Vehicle (AAAV), Joint Strike Fighter (JSF), and Joint Tactical Radio System (JTRS). Our science and technology efforts focus on attaining dramatic increases in our future forcible-entry and power-projection capabilities in anti-access environments. Our technology and systems-development efforts will be closely coupled with continued evaluation and necessary changes in doctrine; tactics, techniques, and procedures; training and education; logistical support; as well as changes within the warfighting template of the MAGTF combined arms team. Through our Marine Requirements Oversight Council (MROC) and the Joint Requirements Oversight Council (JROC) process, the Marine Corps ensures maximum joint interoperability of acquisition programs in order to optimize the Nation's warfighting capabilities.

The following examples reflect our principle transformation and modernization efforts along with our efforts to extend the service life of critical weapons systems and platforms. A

comprehensive description of the Marine Corps' acquisition programs can be found in the publication entitled *Marine Corps Concepts & Programs 2003*.

### Legacy Systems

Operations in the global war on terrorism may require levels of operational agility and tactical flexibility beyond that provided by the Marine Corps' current, aging equipment. TF 58 operations in Afghanistan succeeded, even though we were operating in a harsh high-desert and mountainous environment with major weapons systems that were beyond their planned service lives; but the Marines and their equipment were ready. In addition to having capabilities that are increasingly challenged with the demands of modern warfighting and operational concepts such as Expeditionary Maneuver Warfare (EMW), our older systems present us with greater maintenance and logistical challenges, which we must meet to assure safety and readiness until new systems are fielded. To evolve our force capabilities while fielding new systems, we are taking advantage of service life extension programs (SLEPs) for two important elements of today's MAGTF: Light Armored Vehicles (LAVs) and CH-53E heavy-lift helicopters and continuing the Amphibious Assault Vehicle (Reliability, Availability, Maintainability/Rebuild to Standard) (AAV RAM/RS) program. These programs will improve performance, reliability, and availability for the next decade or more as we develop and field new technologies. The Marine Corps and Navy must also fund major improvements to older, but still relevant, systems. Programs such as the M1A1 main battle tank Firepower Enhancement Program; the UH-1Y/AH-1Z program; the AV-8B Remanufacture Program; and upgrades to our Three-Dimensional Long Range Radars and F/A-18A/C/D aircraft are a few examples that will help ensure that these proven "veteran" systems possess modern capabilities through the coming decade.

### Mobility

While our deployments for missions in the global war on terrorism has demonstrated the current capabilities of the Navy-Marine Corps Team, our continuous transformation and modernization efforts are needed to increase power projection and maneuver capabilities in the future. Several key programs focus on the demonstrated requirement for significantly increased speed, range, payload, and flexibility for maneuver units—mobility. While I understand the committee's focus on ground systems, our MAGTF organization is an inextricable blend of air



and ground mobility and I will discuss both. Our concept includes a vision of an all-vertical lift Air Combat Element, including the introduction of the MV-22 tilt rotor and JSF Short-Take-Off/Vertical-Landing (STOVL) aircraft. The following initiatives are some of the keys to the achievement of Marine Corps air-ground tactical and operational mobility requirement:

**Advanced Amphibious Assault Vehicle.** The Advanced Amphibious Assault Vehicle (AAAV) is the Marine Corps' only Acquisition Category 1D program and along with the MV-22 Osprey Tiltrotor, will provide the principal forcible entry mobility systems necessary to operationalize the Expeditionary Maneuver Warfare concept. AAAV will combine never before realized high-speed land and water maneuver, day/night fighting capabilities, and active and passive countermeasures including advanced armor and Nuclear-Biological-Chemical protection and a remarkably lethal 30mm turreted gun. This—coupled with a systematic integration into emerging service and Joint Command and Control networked information, communications and intelligence architectures—will provide the Marine Corps with a combat vehicle able to overcome the challenges of increased operational tempo, survivability, and lethality across the spectrum of operations. The AAAV will seamlessly maneuver from the sea at 28-knot speed comparable to a DDG-51, and ashore to the objective at 45 mph, speed comparable to our M1A1 tanks.

**Intra-theater mobility.** The KC-130J Advanced Hercules intra-theater airlift aircraft will bring increased capability and mission flexibility with its advanced satellite communications system, survivability enhancements, night systems, rapid ground refueling, and other improvements. The KC-130Js are replacing our oldest aircraft, 40+ years old KC-130 F/Rs. In addition, the Marine Corps is currently testing and validating the use of High-Speed Vessels to enhance our capability to perform a wide range of missions. We believe that these shallow draft, high speed, maneuverable vessels have the potential to enhance our ability to conduct operations by providing intra-theater support from ships in sea-bases and from forward-based locations such as Okinawa, Guam, or from bases in Hawaii and the continental United States.

**Power Projection Platforms.** Combined with embarked Marines, Naval expeditionary surface and submarine combatants in the form of Expeditionary Strike Groups (ESGs) and Carrier Strike Groups (CSGs) provide the Nation with forward-presence and flexible crisis response forces. They also provide truly unparalleled expeditionary forcible-entry capabilities. As part of joint forces, the Navy-Marine Corps team will remain capable of getting to the fight

rapidly in order to decisively deter or defeat adversaries who try to impose their will on our country or its allies. Peacetime rotational requirements are for twelve ESGs with Amphibious warships. Our warfighting requirement is lift for the Assault Echelons of three Marine Expeditionary Brigades with modern amphibious warships. The Navy's shipbuilding programs for LPD-17 and LHD class ships as well as the future LHA(R) ships support these warfighting requirements.

The Maritime Pre-positioning Force (Future) will be the true enabler of sea-based operations. As it becomes operational, future Maritime Pre-positioning Force capabilities will dramatically increase those of today, providing truly sovereign sea based capabilities. These enhanced capabilities are in four areas: (1) Phased at-sea arrival and assembly of units; (2) Selective offload at-sea of equipment and cargo; (3) Long-term, sea-based sustainment of the landing force; and (4) At-sea reconstitution and redeployment of the force.

### **Logistics and Combat Service Support**

The Marine Corps logistics' vision is to significantly enhance the expeditionary and joint warfighting capabilities of our Operating Forces. Throughout history warfighting capabilities have been defined by our logistic capabilities and limitations. Our understanding of the commitment required to maintain a ready and capable combat service support component of the MAGTF is well known. The logistics capability in the MAGTF is as expeditionary as its ground and aviation components. Fully a third of the U.S. Military's active duty combat service support capability resides in the Marine Corps and its relevance in joint force operations cannot be overstated. Hence, we are committed to exploring and implementing programs and actions to increase combat power, operational versatility, and deployability. At the forefront of this effort is the Marine Corps Logistics Campaign Plan that outlines essential objectives and tasks based upon overarching Marine Corps, Naval, joint, and DoD concepts and guidance.

Responsive logistics information technology capabilities that are integrated with our command-and-control architecture and interoperable with Naval and joint systems will be required to achieve emerging warfighting capabilities. The Global Combat Support System – Marine Corps (GCSS-MC) and shared data environment, along with the Common Logistics Command and Control System, will provide logisticians across the Marine Corps with a set of

common logistics assessment, planning, and execution tools that are interoperable with the common operating picture.

The major capability that Marine Air ground Task Forces provide joint force commanders is the ability effectively to sustain expeditionary operations over an extended period of time. In the future, Our Integrated Logistics Capability will allow us to do this more efficiently, leveraging Commercial Off The Shelf (COTS) logistics solutions to provide one logistics system for all organizations within our supply chain, and by increasing efficiencies through process reengineering, and reshaping our logistics force organization.

Our expeditionary nature and Naval requirement to project power "From the Sea" to deep inland objectives, necessitates that we continue to explore reducing the "footprint" of our required equipment and accompanying supplies. The Marine Corps seeks to improve the efficiency of required support for equipment by developing and procuring ground tactical equipment with dramatically better reliability, availability, maintainability, and lower fuel consumption. Our primary support equipment modernization programs include:

**High Mobility Multipurpose Wheeled Vehicle (HMMWV) A2.** The HMMWV is an all-terrain tactical vehicle that provides a variety of wheeled platforms for every element of the MAGTF, including cargo/troop carriers, armament carriers, shelter carriers, and ambulances. The A2 Series are replacing aging (18-years) HMMWV A1 vehicles in the operating forces with 1,738 A2s in FY2004 and 19,280 throughout the program. The HMMWV replacement strategy sustains MAGTF operational capability while improving the reliability, availability, maintainability, durability, safety, and corrosion prevention capabilities of the light tactical vehicle fleet.

**Medium Tactical Vehicle Replacement (MTVR).** The MTVR is the primary direct support tactical wheeled vehicle to transport personnel; ammunition; towed weapons; break-bulk cargo; packaged/bulk petroleum, oil, and lubricants; water; engineer equipment; communications and telephone maintenance equipment; dimensionally standard containers; remotely-piloted vehicles; and commercial containers. The MTVR is replacing the M800 and M900 series 5-ton trucks with a fleet of state-of-the art, commercially based medium trucks with greater mobility, lift, reliability, availability, maintainability, and durability and is currently in Low rate Initial Production.

**Logistics Vehicle System Replacement (LVS).** The LVS Program will replace the current Marine Corps heavy tactical wheeled vehicle, the Logistics Vehicle System (LVS) starting in FY06 with 184. The LVS will transport bulk liquids, ammunition, standardized containers, bulk/breakbulk/palletized cargo, and bridging equipment. The vehicle will also perform heavy wrecker/recovery missions and tow engineer equipment and combat vehicles with the M870A2 semi-trailer. The LVS fills a MAGTF requirement for a heavy ground logistics distribution system that is highly mobile, efficient, extremely rugged, reliable, and flexible. It also will be capable of operating over longer distances with increased payloads. This system will rapidly distribute all classes of supply and possess a self-loading/unloading capability to reduce dependence on external materiel-handling equipment.

### **Fires and Effects**

Operations in the global war on terrorism require that Marine ground units have an increased ability to coordinate precision guided munition strikes. MAGTFs also need modern fire support systems to deliver robust, responsive, lethal, digitized ground-based volume effects fires against area targets that are not appropriate for precision-guided munition attack, and for those times when aircraft and naval gunfire and land attack are not available. Today's requirements for rapid response, accuracy, reliability, and lethality demand a system of systems approach to fires. Accordingly, based on the guidance of the 32<sup>nd</sup> Commandant to "Fix Fires," our current investment programs will deliver within the FYDP a balance array of fire delivery systems, as well as other critical support systems that will markedly improve our support to the Marine MAGTF and Joint Force Commanders, while improving overall force lethality and protection. Current programmed investment in programs such as the Lightweight 155mm Howitzer; High Mobility Artillery Rocket System (HIMARS), Expeditionary Fire Support System (EFSS); and Target Location, Designation and Hand-off System, as well as the Ground Weapons Locating Radar (GWLR), will ensure future expeditionary forces have a broader range of robust, responsive fire support options.

**Indirect Fire-Support.** Our triad of indirect fire-support systems will provide needed firepower enhancements for Marines in the near- to mid-term. The first element of the triad is the Lightweight-155mm (LW-155) towed howitzer needed to replace our current M-198 howitzer, which is at the end of its service life. The Lightweight-155 is a joint Marine Corps-

Army effort that will meet or exceed all the requirements of the current system while significantly reducing its weight allowing the howitzer to be rapidly air delivered by the MV-22 Osprey tilt rotor.

The second element, the High Mobility Artillery Rocket System (HIMARS), will deliver very high volumes of rocket artillery in support of the ground scheme of maneuver. The HIMARS will provide accurate, responsive general support and general support reinforcing indirect fires at long range, under all weather conditions, and throughout all phases of combat operations ashore. It will fire both precision and area munitions to a maximum range of 36 miles.

The Expeditionary Fire Support System (EFSS), the third system of the land-based fire support triad, will accompany Marines in any expeditionary mode of operation. It will be the primary indirect fire-support system for the vertical assault element of the ship-to-objective maneuver force, providing organic fire support for deep operations in rugged terrain. The EFSS, as a system, will be internally transportable by helicopter or tilt-rotor aircraft to allow the greatest range and flexibility of employment for our future operations.

Ground Weapons Locating Radar will provide the Marine Corps with a major leap in its ability to locate enemy mortar, artillery, or rocket-firing positions. These critical target acquisition capabilities will lead to a significant increase in the number of destroyed enemy assets and personnel as well as a great improvement in or force protection from enemy fires.

The Target Location Designation and Hand-Off System (TLDHS) is a man-portable, automated equipment suite that consists of a Day/Night Target Location Module, a Target Designation Module, and a Target Hand-Off System residing in a ruggedized handheld computer. It will allow Fire Support Observers/Controllers to accurately acquire and locate targets, designate them with a laser, and then digitally transmit target data to ground, air, and shipboard fire support platforms and agencies.

**Non-Lethal.** With the increased range and speed of expeditionary mobility assets, the landward area of influence of Naval forces has increased by an order of magnitude. The increasing complexity of military operations requires that our forces possess a variety of lethal and non-lethal weapon systems providing them greater flexibility. The acquisition of non-lethal weapons systems will expand the number of options available to commanders confronted with situations in which the use of deadly force is inappropriate. The Commandant is the DoD



Executive Agent for the Joint Non-Lethal weapons program. The Marine Corps is acquiring robust non-lethal capabilities to address the non-lethal requirements of clearing facilities, crowd control and area denial.

**Naval Surface Fire Support.** Real world operational missions have dramatically increased the depth of operations from the sea. Afghanistan is a recent example. This is consistent with our operational concept and our development of faster, longer-range mobility platforms like the MV-22 and AAV. But our ability to provide Naval fires in support of expeditionary force deep operations has not kept pace with the increased needs. Critical deficiencies currently exist in the Naval capabilities to provide all-weather, accurate, lethal, responsive, and volume fire support throughout the demonstrated depth of littoral expeditionary operations. The Marine Corps supports the Navy's near-term efforts to develop an enhanced Naval surface fire support capability with the fielding of the 5-inch/62-caliber Naval gun and the development of the Extended-Range Guided Munitions. For the future, the Marine Corps supports the development and fielding of the Advanced Destroyer [DD(X)], to be armed with 155mm Advanced Gun Systems and Land Attack Missiles, to meet the Marine Corps and joint force naval surface fire support requirements. Until these improved capabilities are at sea in numbers, our Nation's expeditionary forces ashore will remain at risk for want of suitable sea-based fire support.

**Aviation Fires.** The Joint Strike Fighter (JSF) is the next-generation strikefighter for the Marine Corps, Air Force, and Navy. JSF Short takeoff and Landing (STOVL) aircraft will replace the Marine Corps' AV-8B and F/A-18A/C/Ds. The Marine Corps requires that its STOVL variant is being developed for operations from large-deck amphibious ships, and austere forward operating bases. The STOVL Joint Strike Fighter version can use from three to five times more airfields around the world than existing conventional take-off and landing aircraft. Moreover, because the STOVL variant will be able to operate from strike aircraft carriers and the Navy's twelve large-deck amphibious assault ship, it effectively doubles the number of platforms available for seabased operations. The advantages of a stealthy STOVL strike fighter—with multiple basing options on land or at sea, flying at supersonic cruise, accomplishing its mission with joint interoperable advanced sensors and weapons, and then returning to its expeditionary site—are dramatic. The STOVL Joint Strike Fighter will provide the reliability, maintainability, high sortie generation capabilities, survivability, and lethality that Marines need in the years ahead, and it will transform Naval tactical air strike capabilities for the 21<sup>st</sup> Century.

### **Command and Control**

Two capabilities are essential for expeditionary operations. The first is expeditionary logistics, and the second is expeditionary command and control. Those capabilities, coupled with Marine expeditionary culture and training, allow Marine Air Ground Task Forces to operate anywhere, anytime in support of or in command of joint and coalition forces.

Operations in the global war on terrorism require a greater degree of strategic agility, operational reach, and tactical flexibility. During OEF, the Marine Corps' proven operational reach and tactical flexibility were constrained by a lack of available communication bandwidth; a paucity of interoperable, fused joint and combined intelligence systems; and limited transportation capabilities for strategic and tactical mobility. Bandwidth limits reduced MAGTF access to information gathered by unmanned aerial vehicles and also constrained participation by our mobile command and control suites ashore in higher-level intelligence sharing. The Marine Corps is currently pursuing improvements in these areas by funding programs — such as the Joint Network Management System, Global Broadcast Service Terminals, Intelligence Broadcast Receivers, Common Aviation Command and Control System (CAC2S) and the Unit Operations Center (UOC) — to dramatically improve connectivity and flow of information both within the MAGTF and between the MAGTF and the rest of the joint force.

**Common Aviation Command and Control System (CAC2S):** The CAC2S modernizes or legacy mix of aviation C2 systems, enabling MAGTFs to seamlessly integrate aviation with ground combat operations. CAC2S will condense the applications of six separate ACE (command and control) systems into one combined and coordinated operational system. It will provide a common hardware platform, with similar software, and equipment. CAC2S replaces the current suites of equipment and providing a consolidated, downsized, and automated capability, effectively integrating Marine aviation into joint and combined air-ground operations. The system will provide aviation planning, control, and execution functions designed to enhance warfighting effectiveness and efficiency.

**Unit Operations Center (UOC):** The UOC represents a tremendous improvement in MAGTF command and control in high tempo operations. The UOC is comprised of Combat Centers and Combat Operation Centers (CoCs), providing a centralized facility to host Command and Control functionality for the Command Element, the Ground Combat Element,

the Aviation Combat Element and the Combat Service Support Element. UOC, for the first time, will create an integrated package with expeditionary shelters, power sourcing, cabling, software integration, Local Area Networking, and processing systems. It will be the cornerstone for all tactical combat operations centers. The UOC is scalable and supports command echelons for battalion and above.

Interoperability is the key to improving Naval expeditionary command and control effectiveness, especially as we integrate battlespace sensors in our future manned and unmanned aerial, space, sea surface and subsurface, and ground vehicles. The command, control, communication, and computer (C4) end-to-end interoperability of the Global Information Grid will enhance our ability to conduct joint, combined, multi-department, and multi-agency operations through the use of technology, standards, architectures, and tools.

The Marine Corps continues to work closely with the Joint Staff, Regional Combatant Commanders, and the other Services to develop joint concepts of operations and joint acquisition programs, whenever practical, to synergize and coordinate our capabilities and resources. An example of this process is occurring with the development of the Joint Tactical Radio System (JTRS), which combines numerous single function programs of current inventories into a single, interoperable, joint radio program that will provide secure digital communications while enhancing wideband tactical networking.

### **Infrastructure**

Marine Corps infrastructure consists of fifteen major bases and stations and 185 Reserve facilities in the United States and Japan. In keeping with our expeditionary nature, these installations are the training and exercise bases of the Corps, our launching platforms located near air and seaports of embarkation. They are serviced by major truck routes and railheads in order to allow for the rapid and efficient movement of Marines and their combat equipment and supplies. Recognized as the “fifth element” of the Marine Air-Ground Task Force because of the close link to the operating forces and their operational readiness, the condition of the Corps’ bases and stations is of vital importance to our combat forces. With the ability to train as an integrated combined arms force being a fundamental requirement of the Corps, infrastructure master planning is designed to provide the facilities, training areas, and ranges (both air and ground) to accomplish this requirement effectively and efficiently. With the increasing pressures

of encroachment pressures as the United States economy and population grow, and as the environment outside our bases and stations puts pressure on animal species, airspace, and other important resources, the Marine Corps face significant challenges to provide and maintain a lean and efficient infrastructure that fully meets the need to ensure our warfighting readiness.

**Blount Island Acquisition.** We are committed to undertake the wisest possible course to conserve our real property and, when necessary, acquire additional property when it is mission critical. The Blount Island facility in Jacksonville, Florida, is a National asset that must be acquired to ensure its availability for long-term use. Blount Island's peacetime mission of supporting the Maritime Pre-positioning Force is vitally important, while its wartime capability of supporting large-scale logistics sustainment from the continental United States gives it strategic significance. The facility will play a vital role in the National military strategy as the site for maintenance operations of the Maritime Pre-positioning Force for years to come. The Marine Corps plans to acquire the Blount Island facility in two phases. Phase 1, funded in FY2000 and FY2001, is currently in progress and will acquire interests in approximately 311 acres of land for the primary purpose of ensuring public safety on parcels adjacent to the leased central management operational area. Phase 2, planned for FY2004, involves acquisition of the central maintenance operational area, consisting of over 1,000 acres. Blount Islands proximity to our ground equipment depot at Marine Corps Logistics Base Albany, Georgia and its existing access by rail and road to our Marine Forces Atlantic, Pacific, and Reserve bases and stations makes it a critical piece of our future infrastructure.

**Training at Eglin Air Force Base.** With cessation of training at Vieques, Puerto Rico, the established training ranges, quality of training support, and proximity to the ocean available at Eglin Air Force Base, Florida, can provide Naval Forces with an alternative training capability. We are currently working with the United States Air Force on the required environmental studies for future sea-based and air-ground training and exercises. Eglin's capabilities, location, and tenant commands provide the opportunity to facilitate joint training between Air Force, Navy, Marine Corps, Army and Special Operations Forces. Development of an expeditionary force training capability at Eglin can support the Secretary of Defense's vision and direction for training transformation and the development of a Joint National Training Capability. This type of training will be critical to joint Marine force combat-readiness.

The Marine Corps plans are for two ten-day training exercises with a MEU at Eglin each year. These exercises would include a variety of scenarios such as amphibious landings, raids, mechanized operations, helicopter operations, and live fire and maneuver exercises. No final decision on training activities will be made until the Environmental Assessment currently underway is completed. The Navy and Marine Corps are actively working to sustain cooperative relationships with the local community and the State of Florida.

**Encroachment and Environmental Issues.** Encroachment—defined as any deliberative action that can cause the loss of, or restrict, the use of land, airspace, frequency, or sea maneuver areas—is a serious threat to the future operational readiness of the Corps. Urban and residential areas now surround many Marine installations that were originally remotely situated. This growth is often accompanied by pressure for access to Marine Corps resources, or demands to curtail Marine Corps operations to make them more compatible with rapidly growing developments in surrounding lands. The Corps' training lands also often provide excellent habitat for threatened and endangered species, serving as islands of biodiversity amid the crush of densely populated urban areas around many of our installations, particularly as species are literally driven from surrounding development into the more open space of our bases and stations and training areas. The Marine Corps is proactively engaged with federal, state, and local agencies and governments, as well as nongovernmental organizations, to provide win-win solutions to these encroachment pressures, ensuring compatible land usage and environmental security without degrading training and mission readiness. Our unimpeded access to our installations and ranges is critical to ensure that the Marine Corps remains America's "Force in Readiness."

Our Nation has crafted a strong environmental code of conduct structured on a wide range of federal, state, and local laws and regulations. Vague or inflexible environmental requirements, however, can present significant challenges for Marines performing their primary mission. We support ongoing efforts to seek clarity and limited flexibility in certain environmental laws, so that we may more effectively balance our training requirements with our long-term environmental stewardship responsibilities. Our ultimate goal is to "fight the way we train," while preserving the natural environment. Today, Marines at all levels perform their jobs with an increased awareness of potential environmental impacts. All of our bases and stations, for example, have implemented Integrated Natural Resource Management Plans and aggressive



pollution prevention and clean-up programs. The hard work does not end with these initiatives. The impact of encroachment on the Corps' ability to fully utilize its installations is varied and requires constant vigilance and attention to ensure that operational readiness is not degraded.

#### IV. CONCLUSION

Marines have always had a vision for the future, and we are moving forward with the modernization and continuous transformation efforts needed to make our current vision, Marine Corps Strategy 21, a reality. We fully understand that this requires coordinated efforts with our sister Services because we are the Joint Forces. Each of the Services has its own critical role to play in providing for our Nation's collective security; however, it is important that each of our contributions be, simultaneously, provides unique and complementary capabilities. In particular, the Corps stresses the importance of our historic relationship with the Navy. The Navy-Marine Corps Team has never been stronger, or more necessary for our Nation, providing powerful, sovereign, sea-based force capabilities anywhere, anytime. Naval Vision 21, which contains the Marine Corps Strategy 21 and Navy's Seapower 21, is having tremendous impact it on the Nation's defense industrial base. The aircraft, ship and ground equipment production lines and infrastructure improvements will have powerful effects throughout the Nation for decades to come.

There is no doubt that challenges confront the Navy-Marine Corps Team, indeed our Nation, in the days and years ahead ahead. Our immediate challenge is to sustain the nearly 100,000 Marines currently forward deployed and ready for combat operations if directed. I must, by necessity, consider readiness not only today, but also for the uncertain future. But that too holds its challenges. The Commandant of the Marine Corps and our over 215,000 total force Marines appreciate your long, strong, and continuing support of the Marine Corps. Our value and continued place in the hearts and minds of our countrymen and women is evident here on Capitol Hill. The plans and programs I have described rely on continuing the efforts the Congress and the Administration have made in improving readiness, modernization, and our continuing transformation. Your Corps of Marines is ready and will stay that way.

The major challenges confronting the Marine Corps today center on organizing, training, and equipping our force to better support joint force commanders, now and in the future. The modernization programs that we are pursuing are key to our ability to meet the Nation's,

peacetime and wartime needs. We have well-conceived programs to meet the needs of our Marines, Sailors, and their families, to ensure the readiness of existing systems, to sustain and maintain our readiness, and to balance current readiness with modernization and transformation.

Our capabilities, integrated with those of our sister Services and Special Operations Forces, form the powerful array of military capabilities America needs to confront an increasingly uncertain National security environment. You can remain justifiably proud that the support of Congress has provided to the Marine Corps over the years has resulted in a very ready and capable expeditionary combined-arms force. Thank you once again for the opportunity the Marine Corps was given today. We are grateful for the unwavering support you provide Marines as they answer the nations call to duty. They and I will remain "Semper Fidelis."



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**QUESTIONS AND ANSWERS SUBMITTED FOR THE  
RECORD**

MARCH 20, 2003

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## QUESTIONS SUBMITTED BY MR. WELDON

Mr. WELDON. What is the Army acquisition policy toward Canadian ammunition companies?

Dr. LAMARTIN. 10 USC 2500 defines the US National Defense Technology and Industrial Base as the United States and Canada. Further, 10 USC 2501 states it is the policy of Congress that the National Technology and Industrial Base be capable of meeting the national security objectives set forth in that section. The Army acquisition policy conforms to the national security objectives outlined in 10 USC 2501.

Mr. BOLTON. 10 USC 2500 defines the US National Defense Technology and Industrial Base as the United States and Canada. Further, 10 USC 2501 states it is the policy of Congress that the National Technology and Industrial Base be capable of meeting the national security objectives set forth in that section. The Army acquisition policy conforms to the national security objectives outlined in 10 USC 2501.

Mr. WELDON. How does this policy affect the U.S. ammunition industrial base?

Dr. LAMARTIN. This policy fosters a healthier industrial base with more readily available suppliers and in some cases technological opportunities that would be missed if we were limited to considering only domestic firms and U.S. locations. It also helps to ensure reciprocal treatment of our firms when they bid on Canadian defense procurements, to include ammunition.

Mr. BOLTON. We believe this fosters a healthier industrial base with more readily available suppliers and in some cases technological opportunities that would be missed if we were limited to considering only domestic firms and United States locations. It also helps to ensure reciprocal treatment of our firms when they bid on Canadian defense procurements, to include ammunition.

Mr. WELDON. What biases in the evaluation of contract bids or what Canadian governmental policies must give Canadian ammunition manufacturers an unfair advantage over American ammunition producers?

Dr. LAMARTIN. I know of no biases in DoD's evaluation of contract bids that would give Canadian ammunition manufacturers an unfair advantage over U.S. suppliers.

When it comes to Canadian policies that might give Canadian manufacturers an advantage over U.S. supplies in Canadian ammunition procurements, I understand that the Canadians do restrict certain ammunition procurements to Canadian sources for national security reasons, and to ensure the viability of its munitions industrial capability. This policy is limited to conventional ammunition and components, not "smart" weapons, pyrotechnics, cartridge actuated devices and propellant actuated devices (CAD/PADs), torpedoes and bombs. Approximately 80-90% of Canadian Navy and the majority of Canadian Air Force requirements are satisfied by U.S. sources through the Foreign Military Sales program. Since 2000, approximately 54% of the dollar value of DOD contracts to Canadian sources has been subcontracted to U.S. sources.

Additionally, Section 806 of the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 states that the official designated as the single manager for conventional ammunition (SMCA) in the Department of Defense shall limit a specific procurement of ammunition to sources within the national technology and industrial base in accordance with section 2304(c)(3) of title 10 of the United States Code, if that manager determines that such limitation is necessary to maintain a facility, producer, manufacturer, or other supplier available for furnishing an essential item of ammunition or ammunition component in cases of national emergency or to achieve industrial mobilization. This encompasses all procurements for conventional ammunition including those Army procurements that the SMCA does not manage and procurements by other Military Departments and defense agencies.

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nents, not "smart" weapons, pyrotechnics, bombs. It should be noted, however, that United States firms are getting Canadian cartridge actuated devices and propellant actuated devices (CAD/PADs), torpedoes and contracts. Approximately 80-90% of Canadian Navy and the majority of Canadian Air Force requirements are satisfied by United States sources through the Foreign Military Sales program. Since 2000, I understand that approximately 54% of the dollar value of DoD contracts to Canadian sources has been subcontracted to US sources.

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### QUESTIONS SUBMITTED BY MR. ABERCROMBIE

Mr. ABERCROMBIE. Are you aware of the unfair competitive advantages the Canadian ammunition producing companies enjoy, which include: a) financial guarantee and backing of the Canadian Commercial Corporation; b) no reciprocal opportunity to compete for Canadian Defense requirements; and c) subsidized socialized medicine and its impact on health care costs in Canada?

Dr. LAMARTIN. I do not believe that Canadian firms enjoy any unfair financial advantages. It is my understanding that the pre-contract assistance provided to a Canadian company by the Canadian Commercial Corporation (CCC) is done on a fee for service basis. As for financial guarantees, I assume you mean the performance guarantees provided by CCC, since it has Government of Canada backing. CCC serves as the prime contractor for DOD contracts and in turn, subcontracts with Canadian firms to meet DOD's requirements. As is the case with all of DOD's prime contractors, CCC is responsible for the performance of any subcontractors. The real beneficiary of a performance guarantee is DOD.

The Canadians have stated that for national security reasons and to ensure the viability of its munitions industrial capability, a certain portion of their defense munitions requirements are directed to Canadian sources. However, US firms are also getting Canadian contracts. Approximately 80-90% of Canadian Navy and the majority of Canadian Air Force requirements are satisfied through U.S. sources through Foreign Military Sales. Since 2000, I understand that approximately 54% of the dollar value of DOD contracts awarded to Canadian sources has been subcontracted to U.S. sources.

I am not familiar with the operations of the Canadian health care system or any possible subsidy it might provide to Canadian firms. At this time, it is unclear whether Canadian companies enjoy financial benefits over U.S. companies. To the contrary, it appears that U.S. defense industry sales to Canada are much larger than Canadian sales to the U.S.

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whether Canadian companies enjoy financial benefits over U.S. companies. To the contrary, it appears that U.S. defense industry sales to Canada are much larger than Canadian sales to the U.S.

General MAGNUS. The Marine Corps is not aware of any relationships that exist internal to Canada that supports their munitions industry. The Marine Corps does very little direct business with the Canadian munitions industry. When the Marine Corps does, it is in the pursuit of the best production when considering the following four parameters: performance, quality, schedule, cost.

Mr. ABERCROMBIE. What efforts are being taken within DOD to ensure the ammunition industrial base of the U.S. does not suffer from unfair competition from foreign countries?

Dr. LAMARTIN. The Department monitors trends in the industrial base fairly closely, especially for munitions. While we have noted a shift away from buying large quantities of older, unguided munitions in favor of buying lower volumes of smart munitions, we have adequate statutory and regulatory authority to sustain the domestic industrial base at levels necessary to meet the broad range of our ammunition needs. We do purchase ammunition from foreign sources, but only in limited quantities; over the past six years, DOD ammunition awards to foreign sources have averaged approximately 4% of DOD's total value of ammunition procurements.

Mr. BOLTON. US public law and the Federal Acquisition Regulation provide sufficient legal means to preclude detrimental affects on the US ammunition industrial base that a foreign country or competitor might inflict either deliberately or as a consequence or routine and normal business practices.

It should be noted that over the past six years, DOD ammunition awards to foreign sources have averaged approximately 4% of DOD's total ammunition procurements.

General MAGNUS. Section 806 of the Strom Thurmond National Defense Authorization Act for Fiscal year 1999 vests the single Manager for Conventional Ammunition (SMCA) with authority to restrict the procurement of conventional ammunition to sources within the national technology and industrial base in accordance with Title 10, United States Code, Section 2304(c). Department of Defense (DOD) Directive 5160.65 designates the Secretary of the Army as the SMCA for the DOD. Currently the Marine Corps is working with the SMCA and the other Services in implementation of this requirement. The Marine Corps actively supports this effort and believes that Section 806 allows the SMCA to protect the US munitions industrial base from foreign sources.

Mr. ABERCROMBIE. In light of the current effort to move to a globalization of competition for contracts with DOD and the aggressive efforts to privatize the government owned ammunition base, have you considered devising a formula to take into account the advantages enjoyed by foreign countries when soliciting bids?

Dr. LAMARTIN. Bid evaluation procedures do take into account factors other than price. For instance, past performance, technological advantages, management and risk factors, and contingency requirements are considered. In addition, in evaluating bids from foreign firms the Defense Federal Acquisition Regulation, Part 225, requires the application of a 50% factor to offers from many foreign firms. Many of our allies are exempt from the application of this factor as a result of reciprocal procurement Memoranda of Understanding which were put into place for national security reasons such as interoperability and defense cooperation.

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General MAGNUS. The Marine Corps procures approximately 70% of its conventional ammunition through the US Army. This is completed as part of Department of Defense (DOD) Directive 5160.65 and is one of the roles that the Single Manager of Conventional Ammunition executes for all Services. As such the Marine Corps relies on the Army to address such issues. The Marine Corps believes that Section 806 of the Strom Thurmond National Defense Authorization Act for Fiscal year 1999 vests the Single Manager for Conventional Ammunition (SMCA) with authority to restrict the procurement of conventional ammunition to sources within the national technology and industrial base in accordance with Title 10, United States Code, Section 2304(c). We believe that this law attempts to offset any advantages that foreign countries may have. When the Marine Corps has sought to procure ammunition from foreign countries may have. When the Marine Corps has sought to procure am-



munition from foreign sources, it has gone through the Section 806 approval process prior to that procurement. It should also be noted that in many cases foreign sources seek to team with US companies in support of Marine Corps long term and large requirements.

Mr. ABERCROMBIE. How do you factor in our national security requirements to sustain ourselves during a national emergency?

Dr. LAMARTIN. Planning for contingency requirements is one of the factors considered in our best-buy evaluations. In addition, Section 806 of the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 states that the official designated as the single manager for conventional ammunition (SMCA) in the Department of Defense shall limit a specific procurement of ammunition to sources within the national technology and industrial base in accordance with section 2304(c)(3) of title 10 of the United States Code, if that manager determines that such limitation is necessary to maintain a facility, producer, manufacturer, or other supplier available for furnishing an essential item of ammunition or ammunition component in cases of national emergency or to achieve industrial mobilization. This authority applies to all procurements for conventional ammunition including those Army procurements that the SMCA does not manage and procurements by other military departments and defense agencies.

Additionally, the inclusion of Canada in our National Technology and Industrial Base serves us well in the area of ammunition. Canada provides a second source for many items and given the small size of Canadian firms, they are capable of providing economic production of small lots for emergent requirements during a national emergency. As a result, they provide us with a strategic capability in times of crisis.

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General MAGNUS. The Marine Corps relies predominately on the U.S. Army as the SMCA executor of the Section 806 requirement to address national security concerns.

#### QUESTIONS SUBMITTED BY MR. EVERETT

Mr. EVERETT. The Marine Corps AAV will replace the 28-year-old Amphibious Assault Vehicle. This past January, the Marine Corps announced that low rate initial production (LRIP) of its AAV program would be delayed by one year until the end of 2005. This was done in order to conduct more testing on nine prototypes being built under a \$712 million system development and demonstration contract. The delay in LRIP will result in a one-year delay in fielding of its first unit equipped until FY 2008. This is the second delay of this program by the Marine Corps to fulfill additional testing-the first one occurred in 2001.

1. That issues may have resulted in a second delay in FRIP and required additional testing?

2. If problems are identified as a result of the additional testing, what will be the impact on the restructured schedule?

3. Has the Marine Corps coordinated with the Army, Marine Corps and OSD on the potential cost increases that may occur as a result of the termination of the M1 Abrams tank and Bradley programs?

4. What capability will the AAV provide that the AAV currently does not offer?

General MAGNUS. 1. What issues have resulted in a second delay in Low Rate Initial Production (LRIP) and required additional testing?

A program restructure was executed in concert with the President's Budget 04 (PB04) process. This was due to:

- A decision by the Marine Corps, Navy and Director of Operational Testing & Evaluation to ensure that more Developmental Testing (DT) and comprehensive Operational Testing (OT) was conducted prior to Milestone C (MS C).
- Lessons learned from Program Definition and Risk Reduction (PDRR) testing dictated that more time would be required prior to MS C to complete necessary testing.
- Testing was taking longer than expected for set-up time, safety, fault analysis, etc., and more crew training time was required to qualify crews prior to certain events.

The aggregate of the added DT test time, crew training time, and OT time created a schedule risk prior to MS C. Therefore, the Marine Corps restructured the AAV program to add approximately 12 more months of DT and more robust OT in the 2004/2005 timeframe. As a result, the MS C decision was extended to September 2005 with Initial Operational Capability (IOC) in FY08 and Full Operational Capability (FOC) in FY18.

2. If problems are identified as a result of the additional testing, what will be the impact on the restructured schedule?

- The technical issues identified during this testing are expected to be resolved in a timeframe consistent with program objectives. The effectiveness of design changes will be determined based on the extent and nature of these changes and their impact on program testing. The EFV program is confident that the second generation System Development and Demonstration (SDD) prototypes will meet or exceed all requirements necessary to enter LRIP in FY05.
- The acquisition plan for Expeditionary Fighting Vehicle (EFV) makes allowance for four design, build, and test iterations of EFV to mature the design and to provide its readiness for production and operation. Already, the second iteration of design/build/test cycle has yielded second-generation SDD prototypes that incorporate significant improvements in troop space and comfort, mobility, reliability and safety over the first generation prototypes. All corrective fixes will be demonstrated during extensive testing of the second-generation, SDD vehicles which commenced during FY03 and will continue through a comprehensive MS C Operational Assessment in FY05.
- The revised EFV program is on schedule, within budget and on track for demonstration of all Key Performance Parameters (KPP).

3. Has the Marine Corps coordinated with the Army, Marine Corps and OSD on the potential cost increases that may occur as a result of the termination of the MI Abrams tank and Bradley programs?

The EFV Program Office does not currently anticipate any impact to the program as a result of the termination of the Bradley program, but is working with Office of the Secretary of Defense, Defense Contract Management Agency and the Army (Tactical Command) to address industrial base issues related to changes to the MI Abrams program. Reduced government workload at the Allison Transmission facility in Indianapolis is an issue because this facility is responsible for manufacturing the transmission and power transfer modules for this facility is responsible for manufacturing the transmission and power transfer modules for the EFV. The reduction of Army work at the Allison Transmission facility in Indianapolis is an issue because this facility is responsible for manufacturing the transmission and power transfer modules for the EFV. The reduction of Army work at the Allison Transmission facility has introduced a cost risk for the EFV components built in Indianapolis. The EFV program office is working with OSD and the Army to identify solutions to minimize the impact of this issue.

4. What capability will the EFV provide that the AAV currently does not offer?

The EFV is a replacement for the current Assault Amphibious Vehicle (AAV78A1) that was fielded in 1972 and will be over 30 years old when the EFV is fielded. The EFV will be superior to the current AAV in firepower, survivability, mobility, and command and control. The EFV is a keystone to 21st century warfighting concepts, including expeditionary maneuver Warfare, Ship to Objective maneuver and Joint Operations-Sea Basing.



Performance	EFV	AAV7A1
Firepower	30mm High Velocity Cannon 7.62 Coax Fully Stabilized Turret Full Solution F/C System Laser Ranger Finder 2nd Generation FLIR	.50 Cal Machine Gun MK19 40mm AGL None None None None
Armor Protection	14.5mm @ 300 Meters Integral Spall Protection Mine Blast Protected Seats	7.762mm @ 300m None
NBC Protection	NBC Collective Protection System (Cooled Air for both Crew and Infantry) Ventilated Face Mask for Crew	CBR Unit for Crew None for Infantry
Survivability	"State of the Practice" Visual, Thermal, and Radar Cross-Section Signature Management Technologies	None
Water Speed	20+ Knots	5 Knots
Sea Launch Distance	25 nautical Miles	2 Nautical Miles
Land Mobility	>=M1A1	Limited by Terrain
21st Century Technology	Embedded Training, Interactive Electronic Technical Manuals	None
C4I	VHF UHF SATCOM Integrated GPS EPLRS C	VHF None None Hand Held GPS None None

**FISCAL YEAR 2004 NATIONAL DEFENSE AUTHORIZATION ACT—DEPARTMENT OF DEFENSE UNMANNED COMBAT AERIAL VEHICLE (UCAV) AND UNMANNED AERIAL VEHICLE (UAV) PROGRAMS**

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HOUSE OF REPRESENTATIVES,  
COMMITTEE ON ARMED SERVICES,  
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE,  
*Washington, DC, Wednesday, March 26, 2003.*

The subcommittee met, pursuant to call, at 2:05 p.m., in room 2118, Rayburn House Office Building, Hon. Curt Weldon (chairman of the subcommittee) presiding.

**OPENING STATEMENT OF HON. CURT WELDON, A REPRESENTATIVE FROM PENNSYLVANIA, CHAIRMAN, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE**

Mr. WELDON. The hearing will come to order. Before we begin the proceedings today, I want to acknowledge our valiant and brave men and women in our Armed Forces, those of the coalition and supporting personnel, who are as we speak fighting to defend the fundamental freedoms on which this Nation was founded. Our heartfelt condolences go to families and loved ones of those who have been injured or have given the ultimate sacrifice. And our prayers are with those in harm's way throughout the world and we hope for their safe return.

And just one additional comment. We had a briefing in this room three hours ago which I co-chaired with Chairman Duncan Hunter, and we had the unfortunate opportunity to view for 12 minutes the videotape of our troops that was broadcast all over the Arab world and especially on al-Jazeera TV, and I have never been so outraged in my life to see the despicable lack of regard for human life and the absolute terror in the eyes and minds of the people who support Saddam Hussein. And as I said frequently, even though this is not the purpose of this hearing, I think we are witnessing the 21st century version of Adolph Hitler in terms of the outrageous terror that he has perpetrated on innocent people.

This afternoon the Tactical Air and Land Forces Subcommittee meets to receive testimony on the Department of Defense's (DOD) Unmanned Aerial Vehicle, or UAV, programs and the DOD UAV roadmap of the future.

I would like to welcome Mr. Dyke Weatherington with the Office of Secretary of Defense (OSD) and author of the recently issued DOD UAV roadmap which this committee requested in legislation last year. I would like to acknowledge the military service and Defense Advanced Research Projects Agency (DARPA) representatives seated directly behind him. Thank you all for coming.

In the mid-nineties when I had the opportunity and privilege of chairing this committee's Research and Development (R&D) subcommittee, we together, Democrats and Republicans, advocated a more aggressive approach to fielding UAVs. And I would like to remind our committee Members of the important role that we play as a co-equal branch of the Federal Government, and here is a chance for us to look back at some success that we had because it was in 1996 that our subcommittee adopted and the full committee supported legislation directing the DOD to weaponize both the Predator UAV and the Hunter UAV.

And listen to this, Members; at that time, DOD opposed our initiative. DOD opposed our initiative to weaponize both the Predator and the Hunter. Last year, 6 years after our subcommittee's legislative initiative and DOD's opposition to that initiative, DOD was heralding its weaponization of the Predator. So this committee can take direct responsibility for the action it took in the mid-nineties on UAVs.

At the termination of the Hunter UAV program, the Army put the existing systems in storage. Our subcommittee recognized the utility of a core capability and encouraged the Army to bring those systems out of storage. Now the Army is employing those systems and experimenting with weaponizing some of those UAVs.

In 2000, our subcommittee legislated the establishment of the joint operational test bed for UAVs, to support the efforts of Joint Forces Command, to facilitate joint operational employment of UAVs. And last year, we required that DOD establish an architecture and a roadmap for UAVs.

Today the utility of UAVs is an integral part of our intelligence and operational military capability. It is generally well recognized. The improved situational awareness and emerging rapid strike capability the UAVs can provide without risk to personnel is seen by most as fundamental to successful military operations.

This is not to say that all military service cultural opposition has been overcome, because it has not. The success achieved with UAVs does not come without a significant price tag. Too often, promised capabilities have fallen short, with costs greatly exceeding estimates.

While most agree that a mix of UAV types will be required to complement other Intelligence, Surveillance, and Reconnaissance (ISR) capabilities, there has been and continues to be a controlled proliferation of unmanned vehicle programs within DOD. These range from micro-UAVs on the order of 6 inches in diameter to high-altitude endurance UAVs such as Global Hawk. Almost daily we read about some new UAV that is being developed by DARPA or the military services. Our concern has been that it does not appear to be a logical, effective plan to focus UAV development and acquisition that leads to equipment commonality. We see rapidly changing requirements with a myriad of ground stations and software, communication in control links and sensors as well as the platforms themselves.

As an example, an important program like the X-45 can't seem to break the cultural barrier in the Air Force. Different parts of that service view the program differently. As a consequence, there is no validated requirement. OSD is forced to fund the program be-

cause of Air Force failure to do so. In fact, the fiscal year 2004 Air Force budget submission is different than the DOD UAV roadmap that was just released. The budget request is for the X-45B and the roadmap outlines the UCAV of choice as the X-45C, a vehicle with more than twice the payload as the B model. The schedule and mission for the X-45 has also changed frequently over the past 2 years.

I am also concerned that each program be well managed. To do this, great effort must be made to ensure that not only the air vehicle, but sensors, communication, and all other facets are managed to minimize cost, achieve interoperability, while maximizing effectiveness.

It is clear that modern warfare is based on a system of systems, part of which is ISR. UAVs provide a growing part of ISR that must be fully integrated with other military capabilities. There must be a transition plan that logically introduces UAVs into our Nation's warfighting capability to meet valid requirements. While there may in some cases be justification for several variances of a particular class of UAV, too often it appears that the same propensity exists for UAVs as for manned aircraft for each service to go its own way. This Nation cannot afford to develop the same capability multiple times. And OSD must ensure that any decision not to adopt a common capability is justified.

Before we proceed with Mr. Weatherington's testimony, I would like to recognize my good friend from Hawaii, Mr. Abercrombie, for any remarks he would like to make.

[The prepared statement of Mr. Weldon can be found in the Appendix on page 317.]

**STATEMENT OF HON. NEIL ABERCROMBIE, A REPRESENTATIVE FROM HAWAII, RANKING MEMBER, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE**

Mr. ABERCROMBIE. As usual, Mr. Chairman, I think you stated the case very, very well and I want to get onto the hearing. Suffice it to say for my part, I am very concerned that the priorities may not be straight here, and, as you have indicated, there are some things that I think Congress has initiated that have turned out very well. There are some emphases in this budget that may be misplaced.

And I want to conclude by reemphasizing for the record the role of Congress here. We are not rubber stamps. We are the ones that make the decision, and I think you are on the right track with your opening remarks.

Mr. WELDON. I thank the gentleman for his comments and thank everyone for attending this very important hearing. And with that, we will now turn it over to Mr. Weatherington. And your statement will be accepted as part of the record, without objection, and you may take as much time as you would need, and following that, we will open it up for questions.



**STATEMENT OF DYKE WEATHERINGTON, UAV PLANNING TASK FORCE, DEFENSE SYSTEMS, AIR WARFARE, OFFICE OF THE SECRETARY OF DEFENSE; ACCOMPANIED BY: GARY GRAHAM, DEFENSE ADVANCED RESEARCH PROJECTS AGENCY (DARPA), DEPUTY DIRECTOR, TACTICAL TECHNOLOGY OFFICE; COL. JOHN BURKE, PROGRAM MANAGER, UAVs, UNITED STATES ARMY; CAPT. DENNIS SORENSON, PMA-263, UNITED STATES NAVY; COL. JOHN FEDA, DEPUTY DIRECTOR FOR SURVEILLANCE AND RECONNAISSANCE, UNITED STATES AIR FORCE; COL. MARTIN J. SULLIVAN, DEPUTY BRANCH HEAD, APW, UNITED STATES MARINE CORPS; CAPT. JOHN COSTELLO, J8, JOINT CHIEFS OF STAFF (JCS), UNITED STATES NAVY; PAUL MORGAN, UNITED STATES SPECIAL OPERATIONS COMMAND (USSOCOM)**

Mr. WEATHERINGTON. Thank you, Mr. Chairman. Thank you for the opportunity to bring forward the Defense Department's UAV roadmap. I have a short opening statement I would like to read. Before I get on with that, I would like to introduce just a few members of the large and diverse group of the men and women who are working diligently to migrate UAV capability to the warfighter today.

On my right is Dr. Gary Graham from DARPA, Tactical Technology Office TTO, representing the DARPA organization. I also have Captain Dennis Sorenson representing the Navy, PMA-263 organization; Commander John Costello representing the Joint Staff; Colonel Marty Sullivan representing the Marine Corps; Colonel John Burke representing the Army Tactical UAV Program Office; and Colonel John Feda representing Headquarters, Air Force Operations.

Mr. Chairman and Members of the committee, thank you for the opportunity today to showcase the Defense Department's Unmanned Aerial Vehicles and Unmanned Combat Air Vehicle programs. We are excited about the opportunities unmanned technology offers as the Department transforms to meet future threats and provide a more efficient and safer method to conduct military operations.

Mr. Chairman, I am head of the Department's Unmanned Aerial Vehicle Planning Task Force. In October 2001, the Under Secretary of Defense for Acquisition, Technology and Logistics established this task force as the Defense Department's focal point responsible for assisting the services in their acquisition planning, prioritization and execution of our UAV and UCAV programs. Our goal is to ensure the Department's UAV and UCAV programs proceed in a coordinated and efficient manner. Senior leadership from the Secretary of Defense down is placing great importance on moving this capability into the hands of the warfighter as soon as humanly possible.

Operation Enduring Freedom provided just a glimpse of the contributions UAVs can make on the battlefield of the future. I believe the planning task force has and is successfully contributing to this effort. The task force was instrumental in identifying UAV technologies and systems for rapid transition to aid the warfighter. Funds provided by this Congress after September 11, 2001 have made a significant impact. As an example, all Predator UAV sys-



tems are being upgraded to use the Hellfire missile and many of the vehicles in the Central Command (CENTCOM) theater currently have this capability, and I believe some of those results have been reported recently in the media.

A little over a week ago, on March 17, my office publicly released the second edition of the OSD UAV roadmap, covering the period from 2003 to 2007. The recently released roadmap is a capstone of a year's worth of effort by personnel from the services, joint staff, agencies and combatant commands. The overarching goal of the roadmap is to define a clear direction to the services and agencies for the logical, systematic migration of mission capabilities to a new class of tools in the military tool box, namely UAVs.

The document's specific purpose is threefold:

First, to help provide options to senior decision-makers in the development of broad strategies that will define future DOD force structure. In this regard, the roadmap identifies those mission areas that can be impacted significantly by emerging UAV technology. We want to address the most urgent mission needs that can be supported both technologically and operationally by our UAV and UCAV systems. Some mission areas are well supported by current capabilities inherent and fielded or near-term systems. An example of this might be air lift where the C-17, in combination with other field and transport systems, provides the required capabilities to the warfighters. Other mission areas are in need of additional capability and several of these mission areas present high risk to our air crews. These mission areas will be where the UAV roadmap focuses both in technology and systems development.

The second goal of the roadmap is to help define near-term resource allocation decisions in concert with the defense planning guidance. While there are many potential development options the Department may choose to invest in, the roadmap provides those high-priority investments necessary to move UAV capability to the mainstream. In many respects, it may seem that new UAV ideas and concepts are popping up daily and, in many cases, this is true. The potential capabilities UAVs offer range across virtually every mission area and capability of interest to DOD. At the same time, a systematic, logical method to migrate UAV capability will benefit the warfighter and help organize the use of limited DOD resources.

Finally, the roadmap is a guide to our industry and allies identifying the highest-value areas for independent investment and areas for international cooperation. While our industry partners have and will certainly continue to show innovation, a little help from the government identifying key shortfalls will help focus their attention.

The roadmap is a living document. We will update it as technologies and programs mature. Likewise, as the Department transforms, we will integrate new operational concepts and capabilities. For example, we have recently made a great deal of progress in implementing network centrality that has not been fully reflected in this document. Future updates will capture the latest developments in such areas as version 2.0 of the global information grid, the transformational communications architecture and horizontal fusion initiatives.

Your staffs have recently received advanced copies of the roadmap, so by now you may already be familiar with its layout. In this latest roadmap edition, we have expanded the content and, where appropriate, set goals that will help focus our near-term efforts and allow the Department to measure progress.

The briefing that follows this statement will provide some additional details of the specific content of this roadmap. The services' use of UAVs has come a long way in the past decade.

In 1991, during Desert Storm, Pioneer was the only DOD field UAV system, one that still remains in service with the Marine Corps.

Eight years later during Allied Force, the Department employed three separate systems: Army Hunter, Air Force Predator, and Navy/Marine Corps Pioneer.

During Operation Enduring Freedom (OEF), three systems were employed: Predator, now used in addition to its ISR role, in a strike method; the developmental Global Hawk system; and the Small Pioneer UAV System.

Today, there are over 10 UAV systems in development and being deployed in support of operations in Iraq. Providing a very broad capability, these include Army Shadow, Hunter and Pioneer; Navy/Marine Corps Pioneer and Dragon Eye; Air Force Global Hawk, Predator, and the small force protection surveillance system. In addition, there are several other small UAV systems supporting specialized warfighter requirements.

In summary, the wide array of capabilities offered by UAVs range from the very small hand-held systems to emerging combat vehicles to the very large long-endurance platforms. These vehicles provide dramatic, some would say revolutionary capability to virtually every mission area and at every echelon of command.

The rapid rate at which these capabilities can be developed and delivered to the warfighters uniquely positions the United States to adapt to new and emerging threats. Such a substantial transition requires coordination and detailed planning, crossing traditional service boundaries.

The UAV roadmap provides a defense-wide plan for future UAV and related technologies, ushering in a new era of capability and options for our military and civilian leaders.

Mr. Chairman, this concludes my remarks. I would now like to present a briefing to you and the Members that covers in somewhat more detail the UAV roadmap.

[The prepared statement of Mr. Weatherington can be found in the Appendix on page 321.]

Mr. WEATHERINGTON. Mr. Chairman, Members, the briefing before you has four broad themes outlined in the outline. I would like to spend just a few minutes discussing the roadmap specifically. I would like then to transition to our current programs for a few minutes to describe the impact those current systems are having in operations today, and then finally close with a few ongoing efforts.

On chart 3, we see the roadmap's purpose. As I indicated in my testimony, there are three broad areas that the roadmap chooses to serve. At the very top level, it is to stimulate the planning process for U.S. Military and development of UAVs and how we mi-

grate that capability to our warfighters. At a slightly lower level, it is to assist decision-makers and develop long-range strategies for UAV development and acquisition, and we see this in a number of acquisition programs going on today. Additionally, it contributes initiatives to defense planning guidance and quadrennial defense reviews, and we have seen that in such programs as UCAV. And finally it is a major message to our industry and coalition and allied partners that identify areas for high-risk investment and international cooperation.

Chart 4 addresses some of the key questions that the roadmap attempts to answer. Fundamentally, it describes what capabilities UAVs could potentially provide to the warfighter and the time frames those might be available. It goes into some detail in different technology levels, some of which we have outlined in the chart in the area of platforms. We address engines, signature control and a variety of speed options that UAVs might use. In the sensor systems, which you identified in your statement, we addressed every sensor system that UAVs carry today and could potentially in the future.

Communications is another large area where we have spent a large amount of time in the roadmap describing the future architecture or the current architecture and describing what the future architecture needs to be to adequately support our UAV systems. And finally, a large amount of effort was spent describing information processing and how that will allow us to move more autonomy to the vehicles. We also describe how we can identify and better control costs, foster commonality, and ensure better interoperability in our current systems and certainly in our future systems.

Chart 5 simply is a layout of the document and as I mentioned before, your staff has received this document approximately 2 weeks ago so I won't go into a lot of detail here.

I will point out in regard to this document compared to the earlier document that was published in 2001, we have added 10 appendices to this document that go into a higher level of detail on critical areas we feel are absolutely necessary to foster the full capabilities that UAVs offer.

Chart 6, it is appropriate before we go into the specific UAV programs, to identify the components of all UAV systems that DOD is operating today. While it is not unusual for the vast majority of the population to focus on the air vehicle and that is certainly an important component of the system, the UAV system must encompass all the elements that make it effective to the warfighter. That includes the air vehicle and its payloads and sensors, the communications architecture, and the command and control system. All of these are equally important in the delivery and capability of the warfighter.

And finally, just to highlight the comment at the bottom of that page, today our UAV systems that are deployed supporting the warfighter are contributing to all three of those three broad categories of the dull, dirty, and dangerous missions.

I would like to transition to our current development programs just to give you a top-level view of the progress that the Department has made over the last few years.



Chart 7 is three of our small UAV programs: Marine Corps Dragon Eye, Air Force Protection System (AFFPS), and the Navy Neptune Program. We categorize small UAVs as those less than 100 pounds of weight. I am happy to report that both Dragon Eye and AFFPS are in theater today supporting our troops. And the rapid progress of those two systems is testament to the advantages that UAVs have to rapidly develop and then push capability to the warfighter. Navy Neptune is a unique system in that it can be deployed on land and water. That provides additional capability to our Special Forces team that they currently don't have today.

I also point out that the systems are relatively inexpensive. As you can see, Dragon Eye has a cost of approximately \$36,000 per aircraft. That is based on a very limited prototype production run. The goal of this system is to get the airframe and sensor costs in the range of \$20,000.

Next chart, Pioneer, our longest running UAV program currently being operated by the Marine Corps and supported by the Navy. Operational since 1986. And this program has been a workhorse for the Department. As many of the Members know, this is a technology borrowed from international partners and it represents a first-generation UAV system.

The next chart indicates the Army's Shadow program. I am happy to report that the Army achieved milestone full rate production for this system in September 2003. For this fiscal year, fiscal year 2003, the Army will deliver approximately 28 Shadow air vehicles to support the warfighters. This is a rapid buildup of force capability to the warfighter. And again as I mentioned before, Shadow systems are in theater supporting activities today.

Next chart identifies Army Hunter. The Hunter again is a legacy system, but being used very effectively. Its planned replacement is the Army's extended range multipurpose program beginning in fiscal year 2004. Hunter again has been a work horse, and the Army is using this not only in operations but as a test bed to demonstrate new technologies, including weaponization of their UAVs. I mention that Hunter is helping the Army define its Future Combat System (FCS) requirement for their classes of UAVs that are incorporated in FCS.

The next chart identifies the Air Force's Predator program. Predator as you are aware has been a star of Operation Enduring Freedom and is currently today supporting operations in Iraq. Very successful program and the one that DARPA can take credit for originally, the first Advanced Concept Technology Demonstration (ACTD) that transitioned to service and was successfully integrated into their force structure. Again I am happy to announce that the Air Force will take delivery of approximately 21 Predator systems this year, to a large measure as a result of funds that this Congress provided in the emergency supplemental. In addition to its original mission of ISR, as you are well aware, Predator has been modified with weapons capability and is now providing dual use for the warfighters in Iraq.

Next chart outlines the Global Hawk program, again an Air Force activity; another very successful ACTD transition from DARPA. This program is the most robust and extensive of any UAV program we have thus taken on. While still early in the de-

velopment phase, it is important to note that Global Hawk is now in its second operational deployment to support the warfighters in the field. And an absolutely amazing statistic of the total hours that the system has in development in excess of 40 percent of those hours are in combat support. So again we can see that an acquisition program very early in the development phase can be pushed to the warfighter to provide him capability very early.

Air Force will acquire two Global Hawks this calendar year. In fact, they have already accepted air vehicle 7 earlier this year. And in fiscal year 2004, the Air Force will accept three production Global Hawks. In addition, the Navy, under the Global Hawk demonstration program, is acquiring two air vehicles.

Next chart is another development program that we have, Fire Scout. Fire Scout, being supported by the Navy, has gone through EMD and has achieved over 20 hours of operational test and evaluation. The program is being evaluated for some upgrades that the Navy has determined are appropriate. Navy is going to take this system out and do a rather extensive demonstration supporting, Littoral Combat Ship LCS definition later next year.

Next chart identifies our various Unmanned Combat Air Vehicle programs. The current Air Force Boeing/DARPA program, the current DARPA Navy/Northrop Grumman program, and the current DARPA Army/UCAR program. As identified in the roadmap, this is a rapidly evolving program. I am happy to announce that with Department leadership, we are encouraging the services, Air Force, Navy and Army, to develop a joint program office that would incorporate requirements from those three services into a broad program that would deliver capability to support a range of mission areas.

While the development of that program office is still early in the development phase, I will tell you that the DARPA has a large role in that. As you are well aware, DARPA is currently leading all of these development programs. And the Department, in concert with the services and DARPA, is defining exactly the standup and the definition of that joint program office.

Chart 15 identifies the major various UAV programs that the Department has. We have identified them by service. While it appears that there are a large number of programs, and in some cases that is true, you will also notice that we are transitioning in many cases from those first-generation systems, those Pioneer and Hunter, to our second- and third-generation systems. Those systems have served us well, but in the preceding 10 years we have gained understanding and can better identify new and emerging requirements for UAV systems. I also identify within each of the services, there are small UAV programs that provide new capabilities that are currently not available with our current fleet of UAVs.

The next chart, chart 16, provides a little additional detail on our current UAV systems. The color coding on the left, the blue identifies our current operational systems. The green identifies our developmental systems. Again, it is important to point out, especially for Dragon Eye and for Global Hawk, that while these systems are developmental and we have relatively few assets, we have—the acquisition community, at the request of the warfighter, has pushed these forward for operational use. And while I can't go into details,



I am happy to report that in general our UAV systems are supporting the warfighter very well. It probably is appropriate to notice that in most cases the time between first flight and IOC for these systems is relatively short, again identifying that we can develop and field these systems in a very rapid manner, staying ahead of the threat and adapting to that threat.

Chart 17 identifies the Department's annual funding for UAV programs. I think the important point to note here is the general trend in the chart, that of a significantly increasing slope identifying the value that the warfighter and the services have identified in UAV systems.

The next chart goes into a little more detail on the fiscal year 2004 President's budget. I will point out the major programs. Certainly Global Hawk is a relatively large program as it provides significant capability to the warfighter, and not only for the Air Force, but for the joint service commander. You will see a significant increase over the previous year in the UCAV program, both Army and Navy. I am happy to report that this was an area that had considerable OSD interest and was supported as such.

Also point out that the UCAV line does not include the Army and DARPA UCAV program. We have identified that separately. And there is significant funding in that line also.

Finally, I will point out, the last line, the very smallest UAV programs. While these represent approximately 3 percent of the overall budget, they are providing some of the most robust and rapidly increasing requirements that the Department has.

Chart 19 identifies some ongoing efforts that the Department and the services are working diligently. Certainly, Mr. Chairman, you identified interoperability, and interoperability is one of those two areas that both OSD and the services are focused on to a very high degree. The Department, in concert with the services, is focusing on standard-based approach for interoperability that will not only achieve interoperability at the payload level, but also at the command and control and at the architecture interoperability level. The broad view is that the platform is only one component in the system, and if we can adequately define the interface between the platform and the communications architecture, that allows us to upgrade those platforms at a much more rapid rate.

Area space integration is another area that includes additional effort. For UAVs to fulfill their full capability, we need to integrate them into the military airspace and the civil airspace, and we are working diligently with our industry and government partners, including National Aeronautics and Space Administration (NASA), the Federal Aviation Administration (FAA), and a variety of industry groups to develop the technologies, improve the regulatory aspects and then implement these capabilities into our UAVs.

Finally, weaponization provides us an area for fruitful growth. We have seen just the beginnings of weaponization on a couple of UAV platforms. The Department is taking this seriously and taking a very broad approach. We are working with the services and DARPA to define the process and procedures that would allow us to migrate a broad range of lethal capabilities to a broad range of UAVs.

Chart 20 is a summary of our UAV support to military operations. We have identified the year of those activities and UAV systems supporting it. I will just make a point for this current operation, Enduring Freedom, we have in excess of 10 different types of UAV systems supporting operations, by far the largest increase that we have seen in recent memory. And, as again I mentioned, these systems are providing the warfighter a capability that is virtually impossible for him to achieve through any other means.

In summary, I just would like to say that we have multiple UAV systems supporting our forces today. We have made much progress, but additional progress remains to be made. Our UAV roadmap defines the areas to be worked. In short, we have a plan and we are executing that plan. While much work does remain, the future looks very promising. There are multiple mission areas that seem right for expansion. The Department's goal is to migrate those capabilities in a logical and systematic way, learning from our previous activities and delivering capability early to the warfighter.

Finally, as a broad statement, we do believe that UAVs will continue to complement larger segments of demand and space areas. As technology procedures and familiar area improve, we would expect that additional systems and greater capability would be provided to the warfighter.

Mr. Chairman, that concludes my formal briefing. I will be happy to entertain any questions you have sir.

Mr. WELDON. We will be operating under the 5-minute rule for questions, and that will include myself.

First of all, I want to congratulate you. I think the roadmap you have produced is very thorough and indicates the action Congress took last year in asking the Department to come up with a unified approach to UAVs. The question I had, however, is what methods do you have to ensure that only UAVs that meet validated requirements and incorporate designs that will be inherently interoperable with the future ISR architecture are procured? In other words, what power do you have to direct service compliance with the approved roadmap? And the reason I ask that, one of the reasons, is we had a hearing last week on FCS for the Army. And in their planned series of new initiatives were four UAVs, yet your roadmap only outlines two. So the question becomes: Who really has the authority and is this roadmap going to be adhered to?

I read one article that said we had as many as 90 UAVs operating right now. I don't know if that is true, but it was in the press. It was in an "Aviation Week" article on March 24 this year. It quoted you, not to that figure, but quoted you in that article.

So that is my overall question. We have been very supportive. We have plussed that money, but we are not confident that perhaps we are going to have the discipline to make this process move forward in a coordinated way that does not waste the taxpayers' money but meets the requirements of the warfighter.

Mr. WEATHERINGTON. Thank you, sir. Interoperability and the ability to share information from a variety of platforms, not just UAV platforms, is key to the ability to network and adequately fuse the vast amounts of data that are being collected, again not only from UAVs but potentially ground unmanned systems and service and underwater systems. I am happy to report that the De-

partment in conjunction with Joint Forces Command, Command, Control, Communications and Intelligence (C3I) and joint staff, last year initiated a UAV interoperability working group that is addressing the key interoperability capabilities that we need to enhance our interoperability.

More specifically to your question, I will note in a standard section of the roadmap, we have identified specifically standards that the Department will hold the services to for incorporation into their systems. While I myself have no power, I certainly have the ability to provide recommendations to the senior decision makers at the OSD level for adjustments or modifications to programs to provide that interoperability requirement that we deem necessary. We have joint staff, the J8 folks work hand and glove with us in our interoperability working group, and they have taken a large role, especially in the UCAV program, to define the requirements process and identify those key interoperability requirements early in the process to allow those to be incorporated into the program.

Mr. WELDON. I am also on the Homeland Security Committee, as are some of my colleagues here. I take it your role in the roadmap does not include the use of UAVs for civilian homeland security purposes, and if in fact that is correct, do you think that perhaps the oversight that you are providing should have some homeland security implications? Is there a plan that you are aware of that the new Agency will have its own operational oversight for the use of UAVs?

Mr. WEATHERINGTON. Again, sir, excellent question. As you are aware, the focus of this roadmap was primarily on DOD activities. We are talking to homeland defense, specifically attempting to define their requirements. In general, I would say the current range of capabilities that DOD UAV systems possess probably fill a large fraction of the requirements that Homeland Security has. But specifically we are working with those individuals to identify those specific requirements and identify where we have current capabilities that match and where there are holes. If there are holes, then we would work through a joint activity to develop those technologies that are required, again, because there is probably a high commonality between their requirements and ours.

Mr. WELDON. Perhaps one of the areas we should look at is whether we should look to require a roadmap on the civilian side in this year's bill. I don't mean to embarrass any of the services, but I couldn't help but notice that the Navy has no fielded UAVs. Why?

Mr. WEATHERINGTON. Sir, the Navy's decision to migrate Pioneer to the Marine Corps was the primary result of a Marine Corps requirement for that capability. I think I will let Commander Sorenson answer that question.

Commander DUQUETTE. Mr. Chairman, Commander Dan Duquette. I am the UAV section head for Air Warfare for N78. We have got a lot of plans in the works for UAVs and fielding UAVs. We are real excited about the insert of the technology with the Global Hawk maritime demonstration and getting that capability into the fleet. We are working very hard on tactical UAV and the effort to field the UAV for Littoral Combat Ship (LCS). We are working closely with the Air Force on a UCAV program and field-



ing for the future. And we specifically don't have a UAV fielded right now in the large range, but we are working closely with the Marine Corps and looking forward to the future of what we can get working, sir.

Mr. WELDON. Gentleman from Hawaii, Mr. Abercrombie is recognized.

Mr. ABERCROMBIE. Thank you, Mr. Chairman. Mr. Weatherington, I am disturbed by the point that you made when you said—I believe I am quoting you—you don't have any authority. Did I hear you correctly?

Mr. WEATHERINGTON. Sir, my office has oversight and coordination responsibilities for those UAV activities among the services and DARPA. We report directly to Mr. Mike Wynn, the principal Deputy for the Under Secretary for Acquisition, Technology and Logistics. So we believe we have appropriate access to senior decision makers. We also work closely—

Mr. ABERCROMBIE. To make recommendations then.

Mr. WEATHERINGTON. Yes.

Mr. ABERCROMBIE. Mr. Wynn have the authority?

Mr. WEATHERINGTON. Mr. Wynn, in concert with Under Secretary Pete Aldridge, certainly has appropriate decision making authority at the acquisition level to modify acquisition programs, yes, sir.

Mr. ABERCROMBIE. The reason I am asking the questions is we have to determine whether or not the Congress is going to write legislation that will require certain things to be done, or can we recommend certain things to be done when we require the appropriations and the authorization process?

Mr. WEATHERINGTON. Sir, in general, I would say the message from the Department has been extremely strong with respect to UAVs. In a number of programs, the Department has demonstrated its commitment to migrate UAV technology to the warfighter and to add funding to those programs which we feel are appropriate and the technology maturity is sufficient to demonstrate their capability.

Mr. ABERCROMBIE. Is that manifested in the fiscal year 2004 President's budget? As I look at this, I see Predator goes from 212 to 326. Pioneer, 29 to 36. Hunter, from 34 down to 29. Global Hawk goes up from 509 to 623. Shadow, 179 to 132. Does that reflect what you just said, that these programs that are losing funding are out of favor? Is that the idea?

Mr. WEATHERINGTON. Not at all, sir. If you compare the President's 2004 budget to the 2003 budget, I think in many areas you will see substantial increases in funding. UCAV is only one of those. The Department added almost \$2 billion through the 5-year defense plan for UCAV compared to the 2003 budget and added significant funding for a number of other programs, Predator being one.

Mr. ABERCROMBIE. What relationship do you see to the Predator, the Pioneer, the Hunter, even the Shadow, with respect to the Global Hawk? Where would you put your priority?

Mr. WEATHERINGTON. Those systems are providing capability to a wide range of warfighters' needs. The more tactical systems are focused on the tactical commander in the field. Global Hawk—

Mr. ABERCROMBIE. I understand all that. What is the relationship to one another in terms of priority?

Mr. WEATHERINGTON. Sir, I would say from the Department's perspective, they have virtually equal priority. I have oversight of all those programs and track each one of those program's budgets virtually on a daily basis.

Mr. ABERCROMBIE. You think there is—with respect to the Global Hawk, you say the amount of money that has been spent on that and what we get for it right now, how does that compare to what we are getting out of the Hunter and the Predator, let us say?

Mr. WEATHERINGTON. Certainly, sir, the total investment in Global Hawk is significantly larger than the tactical UAVs. It is a much larger system. Provides—fulfills a different set of warfighter requirements than the tactical systems do. Provides the ability to range much further, look much deeper than the tactical systems.

Mr. ABERCROMBIE. I understand that part. In terms of its utility right now, are you satisfied and can you say to this committee now, that there are sufficient numbers of Predator, Hunter, Pioneer, et cetera, provided for in this budget to meet all the contingencies we are likely to face with the deployments we have right now, as opposed to whether or not the Global Hawk and other such projects, worthy as they might be in and of themselves, might be crowding out some of the budget for that? Can you say with authority to us today that you have sufficient funds to be able to provide for the Predators, the Hunters, et cetera, that are needed right now for the various deployments and likely deployments that will be taking place, and that there is not a competition for those dollars that may be going to the Global Hawk and other programs? I am not trying to trick you. I got to find out because we have to make decisions.

Mr. WEATHERINGTON. Sir, I understand the question. Within the Department, there is always an issue where we have to balance resources and capabilities. The Department, I believe, has taken the lead on supporting the acquisition, development, and fielding of these systems to provide a broad range of capabilities.

Mr. ABERCROMBIE. Excuse me—because I am running out of time—I am asking, do you have enough?

Mr. WEATHERINGTON. The short answer is yes, sir.

Mr. ABERCROMBIE. And you have taken into account the present circumstances. This budget was prepared before we went into this war.

Mr. WEATHERINGTON. With respect to acquisition dollars, yes, sir. Now, if we lose significant assets in our current operations, we will certainly need to replace those assets and we certainly have to support the operating and support budgets for the various services and their capabilities. The President has made—

Mr. ABERCROMBIE. You brought someone from the Air Force with you today, right?

Mr. WEATHERINGTON. Yes, sir, I did.

Mr. WELDON. Could I get an answer there to my question? You got the short straw. You understand why I am asking the question. I am not trying to trap anybody or put anybody on the hook. I am trying to be helpful to the Chairman in making the decision as to



how we allocate what dollars are going to made available to us, given the present circumstances.

Colonel FEDA. Currently we have an executable program, as you have stated.

Mr. ABERCROMBIE. That could be a very unfortunate phrase, depending on how you look at it.

Colonel FEDA. There is always a challenge in the resources. Obviously that is the struggle that we are in now; what are the priorities in the near future and in the long-term? But as of today, we have the fundable and affordable acquisition strategy for Global Hawk.

Mr. WELDON. Mr. Gibbons is recognized.

Mr. GIBBONS. Thank you very much, Mr. Chairman. In the number of years that I have been on this committee, each year the price of these unmanned vehicles keep rising as we progress through the requirements change through each iteration of that vehicle. Give me a brief rundown for the next 5 years what your procurement changes will be on the Global Hawk based on the new price that you have got down here of around \$37 million per copy. What did you have planned, say, 3 or 4 years ago for the number and what are you planning on now at 37 million a copy?

Mr. WEATHERINGTON. Yes, sir; 37 million for the air vehicle and sensors represents the current cost for a spiral 2 Global Hawk that we are procuring in fiscal year 2004.

Mr. GIBBONS. How many?

Mr. WEATHERINGTON. For fiscal year 2004 we plan to procure four of those vehicles. Over time, in a spiral development program such as Global Hawk, we expect to add capabilities to that platform primarily in the area of sensors and communications improvements. We do expect the overall cost of the air vehicles and the sensors to grow over time. We have identified that in a spiral 4 configuration. That is one vehicle that has the upgraded radar signal capabilities and an upgraded electro-optical and infrared system to be in the range of 47 to \$50 million per vehicle.

Mr. GIBBONS. Seems like as we keep adding to the price of these vehicles, we keep pricing them out of our ability to fund them. They just get more and more expensive and we get fewer and fewer of them to do the job we need them to do. I don't know if I read the roadmap correctly that I am looking at here, but as I see that the UAV mishap rate is projected at 15 per 100,000 hours of flight time by the year 2015, this seems to be about four or five times greater than the current fighter aircraft mishap rate. What is the current UAV mishap rate, and what system or limitation is driving that rate and your expectation, and why do you seem to be setting the bar so low at 15 per 100,000 hours?

Mr. WEATHERINGTON. Excellent question, sir. The reliability issue was such a significant one that in this iteration of the roadmap, one of the appendices we added was UAV reliability. Not to be evasive, but our current UAV systems range greatly in mishap rate. Our first generation systems such as Pioneer have a fairly high mishap, about 300 per 100,000 flight hours. Now I must indicate that none of the UAV systems we have today achieved 100,000 flight hours, so we are extrapolating on our current activity.

Predator today has a mishap rate of approximately 31 per 100,000 flight hours, again understanding that it is only flown about a total of 60,000 flight hours. Hunter has a mishap rate of approximately 16 per 100,000 flight hours. As a comparison, the AV-8 Harrier has a mishap rate between 10 and 13 per 100,000 flight hours. Certainly the mishap rate that we have for our current UAV systems is an artifact of their early development, their immaturity, and to some degree training. In general, we have seen an improvement in mishap rate as these systems have matured in the field. We believe the goals that we have set forth in the road-map are achievable.

However, your question as to why they aren't equivalent to manned aircraft, there is always a tradeoff between reliability and the cost of reliability and the mishap rate. You just indicated the concern over the cost growth in UAV systems. That is a fine line that the Department and the developer has to walk between increased reliability, which results in a lower loss rate, and the increased cost that occurs on the platform.

Mr. GIBBONS. At \$47 million a copy, I hope we do start looking at the reliability a little closer than we would on a Predator which costs a far less dollar amount than does a Global Hawk at \$47 million a copy.

Mr. GIBBONS. But putting that aside, what expenditure in my last question, what effort are you putting forward in the R&D to reduce the footprint that is required by these services to operate a UAV, because right now I can tell you that there is a vast difference between other folks in defense that operate these and the Department of Defense in terms of total footprint required to operate a UAV, doing the same mission, same job, 10 times, 10-fold difference? What are you doing to reduce that footprint?

Mr. WEATHERINGTON. Again, sir, an excellent question. In general, I think I can safely say that through the maturity of these systems, the footprint and the requirements for airlift to move these systems into theater and use them effectively has been a large area of concern, and that has been one of the primary areas, especially the Army hazards in the Shadow system. And if I could, I would like to ask Colonel Burke to come up here and identify to you the improvements that the Army has made in the footprint of the Shadow system.

Mr. GIBBONS. Well, if you could do it for the Army, I would also like the Air Force to do it for the Predator.

Colonel BURKE. Sir, John Burke with the Army. The Shadow system in the Army is flown by enlisted pilots and air vehicle operators. An Army platoon consists of 22 soldiers with self-contained logistics. And it also has the ability to jump one-half of the unit and recover at a different location. So in that context we have standardized on what we call the one system ground control station, which is common—will be common across the Army UAV fleet. We are converting the Hunter systems this fiscal year. So we are using the same common ground station.

We are also standardized on the Army HMMWV, the Army standard HMMWV shelter and also the internal computer and componentry. So interoperability between systems from a hard-

ware, software, personnel and training standpoint is common across those classes of vehicles.

Mr. GIBBONS. Well, that didn't tell me you are reducing the number of people that is required to operate it, though.

Colonel BURKE. Well, sir, the current Hunter unit has about 48 people in it. The Shadow unit has 22. So one of the advantages of going to a common ground station (CGS) where you have an automatic takeoff and landing system and the ability to control multiple UAVs does reduce the size of that footprint.

Colonel FEDA. Sir, as we went through the planning stages for the current contingency that we are in one of the things we tried to do was reduce the forward footprint, especially in the Predator, and try and use more reach-back. And what we have done is we have expanded some of that capability to be able to use the resources at Nellis to support the forward operations. That is one thing that we are looking at, trying to minimize the forward footprint, controlling multiple Predators from one ground station at one time. We were not able to get entirely to that point. We think we can do that in the future, though.

As far as the LRVs go, our launch and recovery elements, we have minimized those, and Air Combat Command (ACC) is currently going through a contract of logistics support analysis to determine exactly what kind of mix we can try and migrate to between contractor support and blue suit support.

Originally, the game plan was all blue suit, and as we looked at it, we said, wait a minute, there is probably a smarter and better way to do this. So we are trying to get these synergies.

The reach-back on the exploitation as well, we are able to use our command ground system (CGS) to be able to support multiple platforms forward in our exploitations. So our footprint there is greatly reduced.

Mr. WELDON. I thank the gentleman, and I thank the witnesses.

The gentleman from Florida, Mr. Meek, is recognized for 5 minutes.

Mr. MEEK. Thank you, Mr. Chairman. I have had the privilege in the past, because I am a new Member to the committee, of hearing about these UCAVs, but I wanted to ask a question. I was reading in some of the material that you provided dealing with the AGM-14 Hellfire missile, also the RQI Predator which was designed originally for surveillance purposes.

And I know in Afghanistan just recently during Operation Enduring Freedom in late 2001, the armed version of the Predator demonstrated I guess its capabilities as relates to one Hellfire missile that blew up a car in Yemen—it was identified by U.S. intelligence agents as carrying a senior member of al Qaeda.

Tell me, as it relates to some of the flights that this vehicle has taken in the past, I know that the weather has had a lot to do with some flights being scratched in combat situations. Tell me, are we going to be able to move beyond that, especially what we are facing now in Iraq?

And then my second question would be along the lines of when one of these vehicles goes down as it relates to the technology, need it be surveillance video? I know recently as it relates to a helicopter that went down and what we are dealing with now, that it was de-



stroyed, but it is not—I am just trying to figure out what are the procedures that is followed as it relates to making sure that it doesn't fall into enemy hands?

Mr. WEATHERINGTON. Yes, sir. In general, I will say that when the Predator system was developed it was understood that it had some operational weather limitations. It does have a deicing system that can be incorporated into the system and flown with that. It does help it in severe icing conditions, but you are correct that there are some weather conditions that severely limit Predator's operation.

Now, it is important to understand that the primary sensor for Predator is a TV sensor, an electro-optical ball. So when the weather conditions are such that Predator would have trouble flying, those conditions are probably also such that the sensor systems aren't terribly effective.

Your question as to the level of sensitive technology on it, Predator by and large utilizes commercial off-the-shelf, COTS technology, and so there is really very little, if any, sophisticated technology on the aircraft. The aircraft itself is a very low tech structure. It is fiberglass and composite. So there is not anything to be discerned there. With the exception of the weapons themselves, if the Predator is weaponized on a mission, there is virtually no technology advantage that an enemy could derive from any resultant wreckage that he could scavenge from a crash site.

Mr. MEEK. That was one of the main concerns as it relates to the missile that would be attached to this vehicle and as it relates to the weather issue; even going further down in the notes here, it also—as it relates to the Bosnia theatre in 1996, 1997, nearly half of the 200—only 226 out of 479 actual missions were carried out. It was canceled because of the weather situation, and I know that this is going to be something that is ongoing, especially the War on Terrorism. If we continue to try to operate in the Middle East theater, dealing with the sandstorms, things of that nature, is definitely something I feel we need to focus on as it relates to the weather.

As we move through the roadmap, I didn't really see anything there that was really tuning in and homing in on the conditions issue, the weather issue, and I don't know what kind of—I don't know if we are putting great emphasis or focus on that in the future, because definitely what we have here is going to save American lives, ultimately. And we find that even in the conditions that our troops are in right now, we have folks that are used to dealing with those kind of weather conditions, even though that they don't have the capabilities that we have. They still move forth under those conditions when we time after time recently have hunkered down and secured equipment, things of that nature, under these conditions.

So I guess I would just—if you can go any further on the weather issue, I would like to know about it. I think it would be important to the committee.

Mr. WEATHERINGTON. Certainly, sir. The United States has a range of both man and unmanned assets that provide a broad range of ISR capabilities. In those cases where the weather conditions are such that a Predator or for that matter any other tactical

UAV would not be appropriate to be operated in, we do have other assets. Global Hawk flies at very high altitudes. It utilizes a synthetic aperture radar that can see through most weather conditions. That provides surveillance and reconnaissance capabilities in those cases where Predator could not operate.

I will also say that at the service labs and at the service system program office levels, they are evaluating improved technologies that would extend the range in weather conditions the Predator or other tactical vehicles could operate.

So to this date those technologies have not reached a maturity level where we believe they are appropriate for migration, but certainly in the future as those technologies improve you very well may see improvements to those platforms or incorporation in the new platforms that will allow us to extend our use in the poor weather conditions.

Mr. MEEK. Thank you, Mr. Chairman.

Mr. WELDON. I thank the gentleman. The gentleman from Ohio, Mr. Turner, is recognized for 5 minutes.

Mr. TURNER OF OHIO. Thank you, Mr. Chairman. In looking at your presentation and the different UAVs that are identified, their capabilities and their specifications, they are so varied. And many of them are strikingly different from one another. I know lots of questions have been asked concerning costs and funding.

An issue that I am curious about is how is the technology information from the research and development and implementation of these different systems in the different services being shared so that we can be certain that, for example, the Dragon Eye has all of the information that was learned in doing the force protection aerial surveillance systems for the Air Force so that we can make sure that each of these are the best systems that they can be and we are not repeating either mistakes or losing a technological edge?

Mr. WEATHERINGTON. Again, sir, it is a very appropriate question. I am happy to report that in a number of areas the Department and specifically the planning task force in our role in coordinating service activities has brought individual services together to coordinate development activities that have resulted in common capabilities. One such example is Dragon Eye. Dragon Eye originally had a daylight-only capability. It had a requirement for a nighttime capability, but that was not originally funded in the Marine Corps budget.

The Air Force for its FPASS; that is, Force Protection UAV, had both a daytime and a nighttime capability. The Department was able to bring those two services together and coordinate activities that while the Air Force was developing their nighttime IR capability that could also be utilized on Dragon Eye. So I am happy to report that in that case we were effective in coordinating service activities that saved resources and actually sped capability to the warfighter.

Another example, the Department, as I mentioned, is working on the development of a joint UCAV program office. Certainly those three services, the Air Force, the Navy and the Army, at the technology level share many of the same requirements between those platforms, and so by developing a joint program office that can integrate individual service requirements, we believe we can more



quickly develop those technologies and then apply them quicker to individual service platforms and migrate that capability to the warfighter.

Mr. TURNER OF OHIO. That sounds very good, because besides just the issue of capability issues that might rise to your level of trying to find a solution, just the day-to-day information from research and development processes should be shared that might cause someone else to find an edge or an application for something that might have been missed otherwise.

Also in looking at the list that we have here, I didn't see any reference to research and development of using UAVs and laser weapon systems, I know laser-guided systems and the like, but the lasers themselves as a basis as the weapon.

Mr. WEATHERINGTON. Yes, sir. The Air Force has a long-term plan for development of directed energy systems, not just laser but a whole host of directed energy systems. And Air Force UCAV is one potential platform that those technologies may be migrated to.

The Air Force has a directed energy master plan that specifically identified unmanned systems as a potential platform for incorporation of those technologies where they are mature.

Mr. TURNER OF OHIO. Thank you, Mr. Chairman.

Mr. WELDON. I thank the gentleman.

The gentleman from South Carolina is recognized, Mr. Wilson, for 5 minutes.

Mr. WILSON. Thank you, Mr. Chairman. And Mr. Weatherington, thank you for what you have done and everybody behind you, too, for what you are doing to promote the UAVs. I was in Kuwait in November and was particularly impressed to see how the Predator operated. I was just amazed, and it made me feel a lot better last month when I was visiting the troops at Camp New York on the front lines, the 3rd Infantry Division, the 1st Marine Division, to know that there was the Predator capability of the surveillance. And I just want to thank you for that and what it means to the troops. It may made me just feel very, very good about the security of our personnel.

And I am also interested in continuing the development, in particular with the smaller UAVs and in particular a proposal that would provide small UAVs with the capability for nearly unlimited endurance by transmitting eye-safe laser energy to photovoltaic cells attached to the UAVs. Are you familiar with that technology? And I know there is a lot of other, too.

Mr. WEATHERINGTON. Sir, I believe I will throw that over to Dr. Graham at DARPA.

Mr. GRAHAM. Well, sir, DARPA's role has been to develop technology aggressively over the years, and the Predator program and Global Hawk have their roots back there.

We also are developing sensor technology that might be appropriate. Ultimately though, the acquisition and deployment of that of course is dependent on the services and the coordination is dependent on road map activities like the one that you are hearing about today.

Mr. WILSON. And the interest that I have is to have the maximum number, but it seems like the numbers are so limited. Is

there any reason why they wouldn't be—aside from the cost, more of them being utilized?

Mr. WEATHERINGTON. Sir, specifically for the small UAV area of the larger UAV segment, that is the area that the Department and frankly the services see the largest growth in. You will notice on—

Mr. WILSON. 17.

Mr. WEATHERINGTON [continuing]. Chart 16 that the Marine Corps plans a total buy of Dragon Eye of nearly a thousand airframes, and they are producing those. When they go on contract they will produce those in fairly large numbers. So certainly that is one case where we believe we will see a significant increase in small UAV capability delivered directly to the warfighter, the guy on the ground that can support him and help him make life and death decisions virtually instantly.

Mr. WILSON. Well, that is excellent again. I thank all of you for what you are doing and yield the balance of my time.

Mr. WELDON. The gentleman from Missouri, Mr. Akin, is recognized for 5 minutes.

Mr. AKIN. Thank you, Mr. Chairman. I have got a couple questions here. This is for the Navy. We haven't asked you as many questions this afternoon.

First, what is the Navy looking at in the way of a UCAV demonstration? How many aircraft would be involved, and what sort of a land-based or carrier demonstration would be required? That would be the first question.

Mr. DUQUETTE. Sir, the Navy is working with DARPA and Northrop Grumman, and we see—the demonstration that we are after is specifically about the capability of takeoff and landing on an aircraft carrier.

Mr. AKIN. It is or is not?

Mr. DUQUETTE. It is. So our goal with that demonstrator is to investigate the issues and the technologies involved with taking a low observable vehicle, a tailless vehicle, off on an aircraft carrier in the aircraft carrier environment.

Once we finish that demonstration, then we can move forward and know what challenges are there to—that we can meet to move forward with UCAV.

Mr. AKIN. That kind of leads into my second question. Last year the Navy didn't have sufficient funds to go forward with the UCAV program. Are we on schedule with contractors and funding, and how close is the Navy to starting the program? Is that all dependent on this landing on the carrier?

Mr. DUQUETTE. Well, the first part of the program is the demonstration. We see the demonstration being completed in the—I think it is the 2006 time frame. I can verify that, sir. And that is the first step that we have to take.

Mr. AKIN. Are you saying that the Navy will not be moving forward with the UCAV until that demonstration is complete?

Mr. DUQUETTE. No, sir. I am saying that the first step of our UCAV program is the demonstration. Once we go through that phase and show that we can take off and land on a carrier, then we continue on.

Mr. AKIN. Okay. So until that is done, then, I think I am hearing you say that that has to be established first?

Mr. DUQUETTE. Yes, sir. The aircraft carrier vision for UCAV is that it operates on the aircraft carrier. It is integral part of the aircraft carrier operations, and therefore that is why the demonstration is so critical to make sure we can operate on a carrier.

Mr. AKIN. Thank you. Mr. Chairman, do I have time for one more general?

All right. Just a general question just for somebody who has not studied the unmanned vehicles that much. It seems to me that you could perhaps, particularly going across all the different services, come up with hundreds and hundreds of special things that you would like to have an unmanned aerial vehicle to do for you. On the other hand, it would seem like from a cost point of view, maybe we could come up with something highly sophisticated like small, medium and large and we could hang things on those to fit—or to suit the particular mission. Is this something you have been giving thought to, or is it not quite as easy to keep it simple like that?

Mr. WEATHERINGTON. Sir, at a very top level, that is exactly the Department's perspective. And in fact, in the road map we generally categorize our systems in small, medium and large. So to a large extent the Department views most UAVs as simply a truck that we can modify to carry a number of different payloads, whether those be sensors or weapons or future capabilities that we can envision today.

While there is an idea that fewer is better in this early development cycle, the Department believes strongly that competition is one of our best assets for controlling cost, and specifically for Navy UCAV, the demonstration program, the Department added money in this budget cycle to add competition to that Phase 2(b) demonstration program, the demonstration that will demonstrate near and carrier operations. So we believe that while in the long term we may net down to a few systems, in the developmental cycle more competition generally is better. That is certainly true at the small UAV level where the barriers to competition are very low, where most of these technologies are commercial off-the-shelf and you have a large potential commercial base that can provide you capabilities.

Mr. AKIN. Thank you. Thank you, Mr. Chairman.

Mr. WELDON. I thank the gentleman.

The gentleman from New Jersey, Mr. LoBiondo, is recognized.

Mr. LOBIONDO. Thank you, Mr. Chairman. Mr. Chairman, I believe that you had asked a question earlier about homeland security and what UAVs are being utilized in homeland security missions? I am not sure I heard that answer.

Mr. WEATHERINGTON. The short answer is yes, sir. Today we have a variety of service UAVs that have been used for various homeland security types of missions, border patrol, port security, that kind of thing. So there is resident capability within the Department of Defense for at least some of the requirements that homeland security may have for emerging UAV requirements.

Mr. LOBIONDO. So UAVs are currently being used for some port security missions?



Mr. WEATHERINGTON. Sir, I don't believe we can say today that they are being utilized. There have been demonstrations of how current Department assets could potentially be used for missions such as port security.

Mr. LOBIONDO. And is the Coast Guard involved with development of that plan?

Mr. WEATHERINGTON. Yes, sir. Specifically for the Coast Guard's deep water program, they have identified specific UAV requirements.

Mr. LOBIONDO. So there are some demonstration or tests being done at this point, is that what I am understanding?

Mr. WEATHERINGTON. Sir, my specific insight into the homeland defense requirements is not terribly specific. If I could, I would like to take that question for the record .

[The information referred to can be found in the Appendix beginning on page 327.]

Mr. LOBIONDO. Sure. I would appreciate that.

Another follow-up, I understand that probably in about the year 2010 or 2012, F-16s are planned to be used as UAVs. Is that correct?

Mr. WEATHERINGTON. Certainly, sir, we see a wide range of proposals from industry as how we might utilize emerging UAV systems, whether those be new systems or modifications of manned systems. Certainly we have seen proposals that unmanned, manned aircraft. In many cases these utilize aircraft that have been decommissioned. In fact, my office supports the evaluation of those modifications. In some cases those appear attractive. In general, it is questionable whether in a large sense the modifications and the costs to modify those aircraft are of value in the long term, but it is really on a case-by-case basis.

Mr. LOBIONDO. So there is not a plan at this point that you could see way down the road to use as a replacement of manned F-16s?

Mr. WEATHERINGTON. No, sir. I am not aware at this point in time of any specific plan to unman F-16s that would replace manned aircraft capability.

Mr. LOBIONDO. Last question is have you seen up to this point any personnel issues with pilots in regard to UAVs?

Mr. WEATHERINGTON. I think I would like to get Colonel Feda up here. He has probably got the most experience with Predator on manning issues.

Colonel FEDA. Sir, I don't have a lot of the details, but General Jumper commissioned a study to try to get into how are we going to man that force, how do we migrate it, and our challenge right now is since it is a new area, what we are trying to do is see how we grow a second lieutenant all the way up to the squadron commander and have a career path available for those folks.

Currently, right now what we are doing is taking other pilots, currently qualified in other airframes, and using them to support the Predator and the Global Hawk. And what we are trying to do is study how do we set up a career path for them and what is the source to be able to do that in the future?

Mr. LOBIONDO. I appreciate that. If I could be a little more specific, the pilots that are trained for other airframes, do you find any personnel issues with them being moved over to UAVs with reten-

tion rates or they are not particularly happy to be put in a position of not flying themselves?

Colonel FEDA. I would say when the system was new, there was some resistance to go over there, but I think it has evolved and matured to the point where it is a new mission area, and the guys that are flying them out at Nellis Air Force Base are pretty happy to be there. They enjoy the mission. The weaponization gives them a lot of new area to try to develop more Tactics, Techniques, and Procedures (TTPs) and go from there. So I would say that the people at Nellis are very satisfied flying the system, sir.

Mr. LOBIONDO. Last question I have, Mr. Chairman, is that in my home district is—second district of New Jersey is home to the 177th Fighter Wing, which is the F-16 wing that flies combat air patrols (CAP) currently over Washington and New York.

Is there any plan to integrate UAVs into any of the homeland security missions such as with the 177th or wings like them that would help in the surveillance aspect of what is going on or is that not on the radar screen right now?

Colonel FEDA. Sir, I was just going to say that I don't think right now we are looking at—if we do a near-term CAP capability, to intercept, which is the mission that your unit has. But I do think that like Mr. Weatherington said, we are trying to sort through homeland security, what the mission is, so that we can give them what the exact requirement is so that we can support their mission.

Mr. LOBIONDO. So as you are sorting through with the Department of Homeland Security, is this something you are likely to have a handle on in three months, six months, a year? Can you say, project, guess?

Mr. WEATHERINGTON. Sir, I would say within a year we will have a good handle on what the homeland security requirements are and what are those requirements our current capability UAVs might be able to support.

Mr. LOBIONDO. Thank you. Thank you, Mr. Chairman.

Mr. WELDON. I thank the gentleman.

The gentleman from Virginia Beach is recognized, Mr. Schrock, for 5 minutes.

Mr. SCHROCK. Thank you, Mr. Chairman. Mr. Weatherington, when you get that report for Mr. LoBiondo, I would like to have a copy of that as well, because I am interested in the Coast Guard element of that, and if you are looking for a good port to test in, the port of Hampton Roads is a good one. It just happens to be in the Second Congressional District of Virginia, not New Jersey, but I would like to put my plug in for that.

Mr. LOBIONDO. We will talk about that.

Mr. SCHROCK. We will talk about that. All right. I supported your Coast Guard.

Mr. Weatherington, the Pioneer Improvement Program (PIP) of course is strongly supported by Congress to meet the requirements of the Marine Corps. We also understand the program is structured to address the critical needs of interoperability, logistics and commonality with the Army. I am just wondering what the status is of the fiscal year 2003 funding for that program. Has the Navy executed any of that funding, and what has the Navy done to meet the



issues of, you know, logistics, commonality and operability requirements of the Marine Corps, Marine tactical UAVs with those of the Army?

And to get this in so I don't run out of time, because I know if I asked all the questions that will allow you to answer them all, several of our UAVs use enormous amounts of bandwidth, and I am just wondering if that would limit your capabilities, what your spin is on that, if there is something being done to address that as well.

Mr. WEATHERINGTON. Sir, if I could, while Captain Sorensen is coming up, I will address the bandwidth issue. Certainly the road map identifies one of the key areas that requires additional work as the development of a broad range of coms requirements to support a broad range of UAV missions. I am happy to report that as a cosignatory on the UAV road map was the C3I organization within OSD Command Control and Communications Intelligence, and in fact as part of their development of the transformational communications architecture, UAVs play a prominent role as bandwidth customers for that architecture.

We have taken a first cut—a near-term cut at what the requirements for our current UAV assets are, and we believe we have adequate bandwidth to support that. But as we evolve to combat UCAVs and more robust UAV systems, we believe more attention is required on the communications architecture.

In general as we move more autonomy to the vehicle, that generally requires less bandwidth because we are processing more data on board and moving less. But in a macro sense, C-3I has taken the lead in developing the next level of road maps specifically for the communications bandwidth requirements for our various UAV programs.

Mr. SCHROCK. It is not going to hamper you in any way?

Mr. WEATHERINGTON. Today we are able to manage the bandwidth requirements that we have. Our most aggressive width users are Global Hawk, and we have a plan in place to migrate the Global Hawk program from its exclusive use of commercial communications support over to a system that the U-2 utilizes, the extended tether program, which provides much greater capability. For the tactical platforms, we believe there is adequate support in the commercial industry in the near term, migrating to the longer range transformational communications architecture to support those systems around the 2010 and out time frame.

Mr. SCHROCK. Thank you.

Captain SORENSEN. Thank you for the question on Pioneer PIP. We in the Navy recognize the importance of the Pioneer PIP program to support the Marine Corps that are currently deployed overseas, and there are a number of things we have been doing over the last few months to support that effort. Based on an urgent need statement, we have actually procured 12 Pop 200 sensors, the same sensors as the Army is flying with their Shadow air vehicle. We have integrated those with the Pioneer system, done the flight test and completed the knee tops changes to the system so that it is able to be flown safely and effectively, and those systems are over in theater doing the job right now as we speak.

The other issue I think that you addressed on the Pioneer PIP are the status of the funds. The funding is in-house. We do have a plan to address some of the major concerns of the Pioneer program as it is currently structured. So improve the mobility and reduce the footprint, looking at new launchers.

From an interoperability perspective, we are looking at upgrading a ground control station to a configuration that will allow interoperability with Pioneer as well as with Fire Scout, as well as with our Naval UAVs in the future.

And we are also looking at integrating a tactical common data link (TCDL) in conjunction with the Army, a TCDL, that will allow the system to be interoperable with the current Fire Scout ground station, Fire Scout and then eventually the Shadow as well.

Mr. SCHROCK. Okay. Thanks. Mr. Chairman, I want to thank you for holding this hearing. I think the UAV subject is one of the most exciting that we are seeing and that we are going to see.

I was privileged to—I know nothing about flying except getting on, putting my seat belt on and going, but I sat in the trainer for the F-22 and JSF, and after an hour or so I thought, you know, I could learn this, which told me in this mind that I was probably sitting in the last craft of manned aircraft and that everything from then on is going to be UAV. I know the pilots don't like that very well, but this is a subject we need to address and get more information. I am just sorry every member wasn't here, because it is clearly the future, and everybody needs to understand this and understand it well. And I thank you for coming, and thank you all for participating as well.

Mr. WELDON. And I thank the gentleman for his questions and his involvement, and we appreciate his leadership.

We will go for one additional question for members that might have it. I just have—without objection, I will enter into the record, along with my colleagues, questions that we would ask you to respond to for the record that we won't ask publicly, but one I do want to ask publicly is I have an interest in our lack of focus on rotorcraft research, and there has been some work in rotorcraft UAVs. Would you comment on how rotorcraft UAVs fit into your road map and what your plans and thrusts are for the next 5 years or so in that area?

Mr. WEATHERINGTON. Yes, sir. As the road map identifies, rotary wing UAVs provide a unique capability that is difficult, if not impossible, to achieve through fixed-wing aircraft.

We have heard some discussion on the Fire Scout UAV being developed by the Navy. DARPA has a number of other rotary wing technology programs under development today which are identified in the road map, but just very briefly, DARPA has the A-160 Humming Bird rotary technology, utilizing a hingeless hub that promises to provide very long endurance improvements to rotary aircraft, potentially to the place where we could start to duplicate the very long endurances we get with fixed-wing aircraft with a rotary wing aircraft.

DARPA also has the Canard Road Wing program ongoing and the Army's UCAR program. So we believe that we are exploring a large portion of the mission areas that rotary wing technologies could support in the future.

Mr. WELDON. I would ask you for the record if you and DARPA would both give me the names and the contacts for the rotorcraft work that is being done in the area of UAVs, for the record.

Mr. WELDON. Mr. Abercrombie, do you have any questions?

Mr. ABERCROMBIE. I was consulting, Mr. Chairman. Excuse me. To think, Mr. Weatherington, you were inches from a clean get-away.

How much is the Global Hawk? I think I called it the Golden Hawk before. It was a slip of the tongue. My mind was wandering. I think the Golden Hawk was Errol Flynn. I am not quite sure, but the Global Hawk.

We have got in the GAO report here \$90 million here now, and when I was looking at the budget there under the procurement budget, it was listed at 4 at \$256 million, which would be 60—you know, if I just divided it by 4, which is a crude way of doing it. But is it \$90?

Mr. WEATHERINGTON. Sir, the current Global Hawks that we are procuring in fiscal year 2004, the Spiral 2 versions of that aircraft, are approximately \$36 million for the air vehicle and the sensor payloads. As I indicated before, Global Hawk is a spiral development program where we are delivering initial capability and then growing that capability.

There are some development activities informed in that program. The Air Force is improving the payload capability, increasing it from approximately 2,000 pounds today to a 3,000-pound payload that enables larger and more—

Mr. ABERCROMBIE. Is that going up to \$90 million?

Mr. WEATHERINGTON. Well, sir, that does account for some of the research and development dollars in that line, that account for the total budget for that year.

Mr. ABERCROMBIE. I am just trying to—you don't have to explain—I am just asking you. That could account for it, right?

Mr. WEATHERINGTON. Certainly part of it, sir. There are also development dollars in there for improved sensors that are required—

Mr. ABERCROMBIE. Would that end up making it more than \$37 million a copy?

Mr. WEATHERINGTON. Yes, sir. The Air Force currently projects that a spiral 4 Global Hawk is in the neighborhood of \$50 million for the air vehicle and the sensors.

Mr. ABERCROMBIE. Would that include it being able to be modified to be in the broad area of maritime surveillance activity that the Navy is seeking?

Mr. WEATHERINGTON. Sir, the Navy's Broad Area Maritime Surveillance (BAMS) program is a competitive acquisition. Global Hawk is one of the platforms they are evaluating, but they are evaluating a number of platforms to meet the requirement.

Mr. ABERCROMBIE. Wait. Wait. Wait. The whole idea of being able to add on to the initial part—if you say 37—if you are going to add sensors, you are going to add this and that, all of which increases its capability, that is fine with me and we can discuss back and forth, Mr. Chairman, whether, you know, the utility of that, the military utility. But I was not aware that you were contemplat-



ing—you mean you are contemplating doing a separate experimental vehicle to the Global Hawk?

Mr. WEATHERINGTON. Sir, the Navy has a Global Hawk maritime nonadministration program where they are procuring the Global Hawks to evaluate Global Hawk for the BAMS mission in general. The specific BAMS program is a competitive acquisition program that the Navy will begin, I believe, in fiscal year 2004.

Mr. ABERCROMBIE. But I was under the—this is a surveillance system, right?

Mr. WEATHERINGTON. The program has surveillance requirements, yes, sir.

Mr. ABERCROMBIE. Excuse me, Mr. Chairman. I don't mean to take a lot of time. Am I understanding you correctly that this will be done—or you are going to experiment with the Global Hawk? You are not—they are not contemplating another vehicle? Did I misunderstand?

Mr. WEATHERINGTON. The Navy's decision for the specific solution for the BAMS program could theoretically be a platform that is not Global Hawk.

Mr. ABERCROMBIE. Jesus. Well, we will have to go into it another time, Mr. Chairman, but that sets my heart fluttering. I will follow up with a question for the record.

Mr. WELDON. I thank the gentleman. I certainly don't want his heart fluttering, so I thank the gentleman for his questions.

Other members that have questions? Mr. Gibbons.

Mr. GIBBONS. Thank you, Mr. Chairman, and, Mr. Weatherington, thanks again for appearing before us today. Your testimony has been excellent.

With regard to the Predator having a 400-nautical mile range, duration, multiple hours, the Global Hawk having a 5400-mile range, 30-some-odd hour duration, over the hill line of sight capability and control is a problem, bandwidth problems. When you start data linking down everything that they are capable of doing, what are you doing to control the cost of tethering or actually linking up those systems beyond the horizon for control back to a station, say, at Nellis? What would you be doing? How would you be looking at that? How would you take care of those over the hill—I know you have got to have satellites up there, but you can't always have a satellite in the same place at the right time. What are you doing to link up that control?

Mr. WEATHERINGTON. Generally, sir, I will say for Global Hawk, the satellite communications architecture we are migrating it to has a very broad coverage, virtually global coverage for where we might want to operate a Global Hawk. So satellite access for Global Hawk is well in hand, I believe.

Mr. GIBBONS. So that would be a geostationary satellite that looks at the whole hemisphere?

Mr. WEATHERINGTON. Sir, the specific architecture we would be happy to get with you in another forum. To be more specific at this security level, about all I can say is that architecture is very robust and has been demonstrated with the U-2 program. So we are very confident that is a mature and capable system.

Mr. GIBBONS. And that is the intended system you plan to go with for—

Mr. WEATHERINGTON. Yes, sir.

Mr. GIBBONS [continuing]. Over the horizon control?

Mr. WEATHERINGTON. Yes, sir.

Mr. GIBBONS. Thank you, Mr. Chairman.

Mr. WELDON. I thank the gentleman. Other Members who might have questions, please indicate. Mr. Wilson, Mr. Schrock, Mr. Meek?

No other questions. Let me just say you can—I think the indication by the attendance of the Members and the amount of questions indicates the significance of the importance of this issue. We had 19 Members attend here, which is very unusual.

But even more unusual, I would say to you, is that it is very rare, if at all, that we have someone at your level testify before the House Armed Services Committee. Usually sitting where you are are the chiefs, the 4-stars, the 3-stars, the 2-stars, and I would just say to you that you have done extremely well. In fact, I would put your quality of testimony up against any other witness, and I think my colleagues would probably agree with me on that.

That is a testament to your leadership on the issue, and I would say we have confidence in where you are going. We have some very real questions, but we appreciate the sincerity of the leadership that you have shown here today.

And I also would say the same thing about our colleagues from the services. We thank you for the great work that you are doing, and none of our questions were meant to question the commitment of our troops to the mission that they are involved with and the leadership provided by those distinguished leaders that are here today.

We simply want to make sure that we are giving you the best in the way of resources, and we are doing it in the most responsible way possible to the taxpayers that we have to answer to. But in the end, this committee will always come down on the side of what is best for our warfighters, what is best for those people that are out there serving the country.

So we thank all of you for coming today and for giving us an outstanding hearing. This hearing now stands adjourned.

[Whereupon, at 3:50 p.m., the subcommittee was adjourned.]





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# **A P P E N D I X**

MARCH 26, 2003

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**PREPARED STATEMENTS SUBMITTED FOR THE RECORD**

MARCH 26, 2003

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**Statement of the Honorable Curt Weldon  
Chairman, Subcommittee on Tactical Air and Land  
Forces**

**Department of Defense Unmanned Combat Aerial  
Vehicle (UCAV) and Unmanned Aerial Vehicle (UAV)  
programs hearing**

**March 26, 2003**

Before we begin these proceedings, I want to acknowledge our valiant men and women in our armed forces, and those of the coalition who are, as we speak, fighting to defend the fundamental freedoms on which this nation is founded. Our heartfelt condolences go to the families and loved ones of those who have been injured or have sacrificed their lives in these efforts. Our prayers are with those in harm's way throughout the world, and we hope for their safe return.

This afternoon the Tactical Air and Land Forces Subcommittee meets to receive testimony on the Department of Defense's unmanned aerial vehicle (UAV) programs and the DOD UAV roadmap to the future. I would like to welcome Mr. Dyke Weatherington, Office of the Secretary of Defense, and author of

the recently issued DOD UAV Roadmap who will provide testimony on Department of Defense UAV programs. I also would like to acknowledge the military service and Defense Advanced Research Projects Agency representatives seated behind him.

The utility of UAVs is no longer questioned. The improved situational awareness, and emerging rapid strike capability UAVs can provide is fundamental to successful military operations and timely, accurate information from UAVs forms the basis to rapidly respond to agile enemies, regardless of setting. In addition, UAVs do not place personnel at risk while operating over hostile territories as do manned aircraft.

Over the last few years, both armed (UCAV) and unarmed (UAV) variants have proven their worth throughout the world. However, while most agree that a mix of UAV types will be required to complement other intelligence, surveillance and reconnaissance (ISR) capabilities, there currently appears to be an uncontrolled proliferation of unmanned aerial vehicle programs within DOD. These range from micro UAVs on the order of 6 inches in diameter, to high altitude endurance UAVs such as Global Hawk. While only a few are operational, we read almost

daily about some new UAV that is being developed by DARPA or the military services.

I am concerned that there does not appear to be a logical, effective plan to focus UAV/UCAV development and acquisition that leads to equipment commonality where prudent and mandatory interoperability for all systems in a theater. We see myriad ground stations and software, communication and control links, and sensors as well as the platforms themselves.

I am also concerned that each program be well and efficiently managed. To do this great effort must be made to ensure that not only the air vehicle, but sensors, communications, and all other facets are managed to minimize costs while maximizing effectiveness.

It is clear that modern warfare is based on a system of systems, part of which is ISR. UAVs provide a growing part of ISR that must be fully integrated with other military capabilities. There must be a transition plan that logically introduces UAVs into our nation's war-fighting capability to meet valid requirements. While there may, in some cases, be justification for several variants of a particular class of UAV, it appears that the same

propensity exists for UAVs as for manned aircraft, for each service to go their own way. This nation cannot afford to develop the same capability multiple times, and OSD must ensure that any decision not to adopt a common capability is justified.

I would like to proceed today with Mr Weatherington's testimony and then go into questions, but first--

I would now like to recognize the gentleman from Hawaii and my good friend, Neil Abercrombie, for any remarks he would like to add.

(Back from Abercrombie)

Before we begin, without objection, Mr Weatherington's written testimony will be accepted for the record.

Mr. Weatherington, the floor is yours.

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HOUSE COMMITTEE  
ON ARMED SERVICES**

**TESTIMONY OF**

**MR. DYKE WEATHERINGTON**

**DEPUTY, UNMANNED AERIAL VEHICLE PLANNING TASK FORCE**

**OFFICE OF THE UNDER SECRETARY OF DEFENSE**

**(ACQUISITION, TECHNOLOGY AND LOGISTICS)**

**BEFORE THE UNITED STATES HOUSE**

**COMMITTEE ON ARMED SERVICES**

**SUBCOMMITTEE ON TACTICAL AIR AND**

**LAND FORCES**

**March 26, 2003**

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ON ARMED SERVICES**



Mr. Dyke Weatherington's Testimony  
To  
HASC Subcommittee on Tactical Air and Land Forces

Mr Chairman and Members of the Committee, thank you for this opportunity to showcase the Defense Department's Unmanned Aerial Vehicles and Unmanned Air Combat Vehicle Programs. We are excited about the opportunities unmanned technology offers as the Department transforms to meet future threats and provide more efficient methods to conduct military operations.

Mr Chairman, I am head of the Department's UAV Planning Task Force. In October 2001, the Under Secretary of Defense (Acquisition, Technology and Logistics) established the Task Force as the Defense Department's focal point responsible for assisting the Services in their acquisition planning, prioritization, and execution of Unmanned Aerial Vehicles known as UAVs, and Unmanned Combat Air Vehicles which we call UCAVs. Our goal is to ensure the Department's UAV and UCAV programs proceed in a coordinated manner.

Senior leadership from the Secretary of Defense on down is placing great importance on moving this capability into the hands of the warfighters as soon as possible. Operation ENDURING FREEDOM provides just a glimpse of the contributions we believe UAVs make on the battlefields of the future. I believe the Planning Task Force has, and is successfully contributing to this effort. The Task Force was instrumental in identifying UAV technologies and systems for rapid transition to aid the warfighter. The funds provided by Congress after September 11 have made a significant impact. As an example, all Predator UAVs are being upgraded to use the Hellfire missile and many air vehicles in the CENTCOM Theater currently have this capability.

A little over a week ago on March 17, my office publicly released our second edition of the UAV Roadmap covering the period from 2002-2027. The recently released Roadmap is the "capstone" of a year's worth of effort by personnel from the Services, Joint Staff, Agencies and combatant commands.

The overarching goal of the Roadmap is to define a clear direction to the Services and Agencies for a logical, systematic migration of mission capabilities to a new class of tools for the military toolbox, namely UAVs.

The document's specific purpose is threefold: First to help provide options to senior decision makers in development of broad strategies that will define future DoD force structure. In this regard the roadmap identifies those mission areas that can be impacted significantly by emerging UAV technology. We want to address the most urgent mission needs that can be supported both technologically and operationally by various UAV and UCAV systems. Some mission areas are well supported by current capabilities inherent in fielded or near-term systems. An example of this is airlift where the C-17 in combination with other fielded transport systems provides the required capability for our warfighters. Other mission areas, however, are in need of additional capability and several of these mission areas present high risk to aircrews. These are the mission areas the UAV Roadmap will focus on, both in technology and systems development.

The second goal of the Roadmap is to help define near-term resource allocation decisions in concert with the Defense Planning Guidance. While there are many potential development options in which the Department may choose to invest, the Roadmap provides the "high priority" investments necessary to move UAV capability to the mainstream. In many respects, it may seem that new UAV ideas and concepts are popping up daily, and that is true. The potential capabilities UAVs offer range across virtually every mission area and capability of interest to DoD. At the same time a systematic logical method to migrate UAV capability will benefit the warfighter, and help organize the use of limited DoD resources.

Finally the roadmap is a guide to our industry and allies, identifying the highest value areas for independent investment and areas for international cooperation. While our industry partners have, and will certainly continue to show innovation, a little help from the government identifying key shortfalls will help focus industry attention.

This Roadmap is also a living document. We will update it as technologies and programs mature. Likewise as the Department transforms, we will integrate new operational concepts and priorities. For example, we have recently made a great deal of

progress in implementing network centrality that is not yet fully reflected. Future updates will capture the latest developments in this area such as Version 2.0 of the Global Information Grid, the Transformational Communications Architecture, and Horizontal Fusion Initiatives.

Your staffs received advanced copies of the Roadmap so by now you may already be familiar with its layout. In this latest Roadmap edition, we expanded the content, and where appropriate set goals that will focus our near-term efforts and allow the Department to measure progress. The briefing that follows this statement will provide additional details on the specific content of the roadmap.

The Services' use of UAVs has come a long way in the past decade. In 1991, during DESERT STORM, Pioneer was the only DoD fielded UAV system, one that still in service with the Marine Corps today. Eight years later, during ALLIED FORCE, the Department employed three systems: Hunter, Predator, and the Pioneer. During Operation ENDURING FREEDOM, three systems were employed: Predator, the developmental Global Hawk, and the small Pointer UAV system. Today, over 10 different UAV systems are deployed supporting operations in Iraq, providing a broad range of capabilities: Army's Shadow, Hunter and Pointer; Marine Corp's Pioneer and Dragon Eye; Air Force's Global Hawk, Predator, and Force Protection Surveillance System, and several other small systems supporting specialized requirements.

In summary, the wide array of capabilities offered by UAVs ranges from the very small hand-held systems, to emerging combat vehicles, to the very large, long endurance platforms. These vehicles provide dramatic, some would say revolutionary, capability to virtually every mission area and at every echelon of command. The rapid rate at which these capabilities can be developed and delivered to warfighters uniquely positions the United States to adapt to new and emerging threats. Such a substantial transition requires coordination and detailed planning crossing traditional Service boundaries. The UAV Roadmap provides a Defense-wide plan for future UAV and related technologies, ushering in a new era of capabilities and options for our military and civilian leaders.

Mr Chairman, this concludes my prepared remarks, I am now ready to present a briefing to you and the other subcommittee members present that covers somewhat more detail of Department's UAV Roadmap.

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**QUESTIONS AND ANSWERS SUBMITTED FOR THE  
RECORD**

MARCH 26, 2003

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## QUESTIONS SUBMITTED BY MR. ABERCROMBIE

Mr. ABERCROMBIE. The Navy is in the process of establishing an acquisition program for the Broad Area Maritime Surveillance (BAMS) UAV which will provide persistent unmanned, long dwell Intelligence, Surveillance, Reconnaissance (ISR) capability to the warfighter. Although the Navy plans to select the BAMS UAV platform through a competitive process there is significant Congressional concern that the Navy is locking themselves into a very expensive Global Hawk solution without taking into account the capabilities of other UAVs. This is evident through the Defense Department's current effort to procure two Global Hawks for the Navy's BAMS UAV concept exploration and experimentation.

Due to the extreme DOD budget constraints that Congress faces, is the Navy pursuing a cost effective solution for the Navy BAMS mission and why is the Navy not acquiring an aircraft such as the proposed Predator B that is already in the U.S. Air Force at a unit price of 1/10<sup>th</sup> the cost of Global Hawk?

Mr. WEATHERINGTON. The Navy is committed to acquiring an affordable family of UAVs to provide a range of capabilities to the joint warfighter and meet existing requirements. The Navy procured two Global Hawks for demonstration purposes, developing Concepts of Operation (CONOPS), participating in fleet battle experiments in Navy and Joint Service demonstrations, and warfighting exercises.

The Navy continues to refine its platform choices for the BAMS UAV program with platform, sensor, communications and support requirements being tailored to leverage developed and demonstrated systems to minimize cost and schedule. During the Analysis of Alternatives phase of the program, completed last year, over 41 different platform options were considered. These 41 options were reduced to eight platforms for more detailed analysis. The final result was three platforms (Global Hawk, Predator B, and the Gulfstream G550), ranked for performance and life cycle cost including payload capacity, sensor power, and speed. The Department of the Navy has not made a final decision regarding the BAMS UAV acquisition program.

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## QUESTIONS SUBMITTED BY MR. LOBIONDO

Mr. LOBIONDO. So UAVs are currently being used for some port security missions? And is the Coast Guard involved with development of that Plan? Are there demonstration or tests being done at this point?

Mr. WEATHERINGTON. Current Department of Homeland Security (DHS) efforts focus on defining and refining DHS Unmanned Aerial Vehicle (UAV) operational requirements. Three recent UAV exercises that directly support the on-going DHS requirements generation process include an operational deployment conducted by U.S. Immigration and Customs Enforcement and demonstrations conducted by the U.S. Coast Guard and the U.S. Customs and Border Protection. The significant progress being made in defining and refining DHS UAV requirements would be impossible without the strong support being provided by the Department of Defense. The Department of Homeland Security and Department of Defense are working closely to maximize the synergy among their UAV programs.

### 1. Immigration and Customs Enforcement Operation Altura Vista

Operation Altura Vista was an initiative of the Tucson Aviation Operations Branch of the U.S. Immigration and Customs Enforcement (U.S. ICE) Office of Air and Marine Operations (AMO). The operation's purpose was to assist Customs and Border Protection in identifying, disrupting, apprehending, and detaining groups of illegal immigrants and narcotic smuggling organizations entering the country through the western desert.

Operation Altura Vista employed a UAV as a high altitude surveillance, detection, and monitoring platform, working in concert with AMO's organic UH-60 for the interdiction and apprehension phase. The UAV was a General Atomics, Aeronautical Systems Incorporated (ASI) Predator-B with Wescam MX-20 Electro-Optical/Infrared sensor, and the Lynx Synthetic Aperture Radar (SAR) System.

U.S. ICE and Customs and Border Protection personnel successfully directed the UAV, monitoring known historic smuggling routes inside the area of operation. Once a border incursion was detected the U.S. ICE agents, augmented with Border Patrol agents, coordinated the interdiction effort. Over a 21-day period there were a total of 15 UAV flights, resulting in 18 detections. Four detections resulted in the tracking and interdiction of confirmed smuggling perpetrators. The operation concluded on November 14, 2003, having flown a total of 107 hours, yielding the seizure of 2400 lbs. of marijuana, 3 vehicles, 1 firearm, 8 arrests, and 22 apprehensions of illegal immigrants.

## **2. Predator UAV Demonstration Conducted by U.S. Coast Guard**

A U.S. Coast Guard (USCG) exercise was conducted from Nov. 13-18, 2003, in King Salmon, AK, using two U.S. Navy (USN) Predator A UAV systems. Six flights were successfully completed. This exercise was the first of a two-phase demonstration that will culminate in spring 2004. The goals of the demonstration included: exercising the logistics and administrative machinery required to support a UAV deployment; developing strategies to overcome the obstacles presented by cold/harsh weather operations; and collecting data on platform and sensor performance as a baseline for Coast Guard/DHS UAV development.

In late Spring the USCG with the assistance of the USN and U.S. Air Force will conduct the second phase of the demonstration with a three-week exercise in Alaska, utilizing a Predator B aircraft with an optimized maritime sensor suite. This evaluation will gather operational data to validate modeling and simulation used in support of Coast Guard trade studies.

## **3. Customs and Border Protection Unmanned Aerial Vehicle Demonstration**

In June 2003, in response to an inquiry from the Secretary of Homeland Security, U.S. Customs and Border Protection (CBP) assembled a working group to determine whether UAVs could enhance its border mission. The group concluded that UAVs could enhance CBP's border mission, the most critical mission being an "eyes on" capability to assist in the detection, interdiction, and apprehension of illegal aliens and the interdiction of illegal contraband in the most remote southern and northern border areas.

Subsequently, the Border Patrol developed a list of desired UAV operational performance requirements and solicited vendors for information on UAV platforms with "off-the-shelf" capabilities for the border mission.

Simultaneously, Border Patrol personnel participated in UAV missions with Army personnel operating the Shadow 200 UAV along the southwest border. The initial operational evaluation clearly illustrated that successful operations depend on more than the UAV platform.

- UAV operations can be resource and infrastructure intensive. When using Fort Huachuca as the base of operations Border Patrol personnel saw firsthand how much equipment, how many personnel, and the type of dedicated support facilities that are required for UAV operations.

After receiving solicitations from 23 different UAV vendors, the working group selected six vendors to brief the working group and demonstrate their UAV capabilities at Fort Huachuca during the week of October 6-12, 2003. These briefings and demonstrations reinforced preliminary CBP findings that, properly outfitted, UAVs could be force multipliers. The six UAVs were selected based on their capabilities relative to selected CBP performance parameters. The working group selections provided a broad range of capabilities and, while varying in everything from price to flying altitude, were all compatible with CBP's mission. The results of the joint CBP and Army UAV trials and the vendor demonstrations indicate that UAVs can enhance CBP's border mission.

**FISCAL YEAR 2004 NATIONAL DEFENSE AUTHORIZATION ACT—AIR FORCE AND NAVY TACTICAL WEAPON SYSTEM ACQUISITION PROGRAMS AND FUTURE TECHNOLOGY INITIATIVES**

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HOUSE OF REPRESENTATIVES,  
COMMITTEE ON ARMED SERVICES,  
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE,  
*Washington, DC, Wednesday, April 2, 2003.*

The panel met, pursuant to call, at 2:55 p.m. in room 2118, Rayburn House Office Building, Hon. Curt Weldon (chairman of the subcommittee) presiding.

**OPENING STATEMENT OF HON. CURT WELDON, A REPRESENTATIVE FROM PENNSYLVANIA, CHAIRMAN, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE**

Mr. WELDON. The subcommittee will come to order. I apologize to our witnesses for our delay. I have been given word that our distinguished Ranking Member has officially given his blessing that we start the hearing without a member of the minority side here. So since Congressman Skelton was here, we will proceed and try to get this hearing moving since Secretary Rumsfeld is due over to the House at 4 o'clock.

This afternoon we will receive testimony from Departments of the Navy and the Air Force witnesses on the President's fiscal year 2004 budget request for tactical programs. Before we proceed, I want to again commend our men and women serving in all of our military services, coalition personnel and those supporting them for their dedication and professionalism in the ongoing war on terrorism and elimination of weapons of mass destruction. We wish all of our personnel Godspeed and congratulate them on the outstanding job that they are currently involved in and doing.

In following the war in Iraq, one has to be impressed with how well our people are performing and how well the equipment that has been provided them is performing under the most stressing of environments. Yet in some instances we can and must do better, specifically in the area of friendly fire. With the complexity of the operation, accidents are to be expected, but we certainly can never and should never accept them. Unfortunately, we pay a great deal of attention to the friendly fire issue during wars, but insufficient attention to them between wars.

While we have intense interest in how events are unfolding on the battlefield, our objective must be to provide the weapons systems of the future that will deter potential enemies and, failing that, will decisively win tomorrow's battles. We must seek to provide the proper resources that will achieve the right balance of af-



fordable force structure and capabilities to meet the new challenges that surely lie ahead.

As has been demonstrated too often, acquiring affordable systems is a difficult challenge. The list of issues that result in broken programs is well known; to reiterate a few, the failed requirements process, inadequate funding, moving forward with incomplete designs and immature technologies, failed leadership and bad management, and lack of competition.

I am confident that leadership of the Office of the Secretary of Defense (OSD) and the military services is trying to avoid missteps of the past that have yielded failed programs. Yet in reviewing the budget request before us, many of the reasons for past failures are evident in proposed programs. To mention just a few, the F-35 Joint Strike Fighter (JSF) program has cut development funding for the competing engine program. Funds are being requested for new electronic combat programs without an agreed-to electronic combat architecture or development plan. The Unmanned Combat Air Vehicle (UCAV) program lacks an agreed-to requirement, with the current budget request being different than the recently published Unmanned Air Vehicle (UAV) road map. And the F-22 request proposes increasing production with outstanding development problems.

To address these and other important issues today, we will have two panels. The first will address Navy and Air Force acquisition issues, and the second will focus on the status of the F/A-22 program.

I would like to welcome today's witnesses for the first panel: The Honorable John J. Young, Jr., Assistant Secretary of the Navy for Research, Development and Acquisition; Rear Admiral Mark P. Fitzgerald, Air Warfare Division, Navy Warfare Requirements and Programs; Lieutenant General Michael A. Hough, Deputy Commandant for Aviation Headquarters, Marine Corps; the Honorable Dr. Marvin R. Sambur, Assistant Secretary of the Air Force for Acquisition; and finally, Lieutenant General Ron E. Keys, Deputy Chief of Staff for Air and Space Operations, United States Air Force.

Usually at this point in time I would ask the gentleman from Hawaii, our ranking member, for any remarks he would make. I would reserve the opportunity for him to make those remarks, and the same thing would apply to Mr. Skelton, who usually shows up at these hearings.

And we now will begin, and, Secretary, we would ask you to keep your comments as brief as possible. Your statements will be entered in the record without objection, and we invite you to make whatever comments that you would so desire.

Secretary Young, the floor is yours.

[The prepared statement of Mr. Weldon can be found in the Appendix on page 375.]

**STATEMENT OF JOHN J. YOUNG, JR., ASSISTANT SECRETARY OF THE NAVY (RESEARCH, DEVELOPMENT AND ACQUISITION), DEPARTMENT OF THE NAVY**

Secretary YOUNG. Mr. Chairman, thank you very much for the opportunity to testify on our tactical aviation programs for fiscal year 2004.

I recently visited our sailors and marines in the Persian Gulf area, and I am proud to report that the commitment that we made and Congress supported in fiscal year 2003 to focus our taxpayers dollars towards improving current readiness has yielded strong dividends. Today we have over 70 ships, 370 tactical aircraft, more than 55,000 sailors and 60,000 marines in theater who are trained, equipped and carrying out the Nation's will, and our prayers are with them.

The fiscal year 2004 budget sustains the enormous strides we have made in personnel and readiness accounts and also maintains a balanced approach to new procurement and modernization. By cultivating promising aircraft technologies, efficiently acquiring mature systems, and improving maintenance of existing systems, we have been able to increase the number of airplanes from 89 indicated in the fiscal year 2003 budget to 100 in fiscal year 2004.

The 2004 request proposes innovative and creative approaches to achieving greater combat air capability. First the Department's initiative to integrate Navy and Marine Corps tactical aircraft will achieve significant reductions in procurement and operating support costs while achieving combat requirements and readiness levels. Integration is enabled by improving the reliability and maintainability of current and future systems, reducing the maintenance pipeline by properly funding spares and depot maintenance, and enhancing support of our deployed systems. Our plan will enable us to reduce procurement objectives for the F-18E/F and the JSF, promising savings of almost a billion dollars in fiscal year 2004 through 2009, and approximately \$19 billion beyond and through 2012.

Another innovative step, the Department has worked with the Air Force, OSD and Defense Advanced Research Projects Agency (DARPA) to forge a joint unmanned combat air vehicle program. Clearly unmanned air vehicles will play a significant role in our future operations. The fiscal year 2004 budget reflects the Navy's commitment to a coherent program, bringing that capability as quickly as possible.

We have developed a joint strategy with a program that meets common requirements while maintaining the flexibility to support service-unique functions. The structure of this effort will provide competition among UCAV contractors and with the goal of a JSF-like acquisition strategy that results in a selection of a common platform with service-unique variants.

We also are continually advancing the current and future combat value of our airplanes. The mid-multifunction information distribution system, or MIDS, provides the capability to share the airspace picture amongst all link-16 capable ships and aircraft. The next system is evolving cooperative engagement capability (CEC) to provide an enhanced high-confidence air picture for systems like the E-2C. A CEC-equipped E-2C with the radar modernization up-



grade and the evolving extended-range active missile provides a transformational enabler against current and future cruise missile targets, particularly those operating over land.

The budget, as you know, sir, includes \$3 billion for 42 F/A-18E/F Super Hornets, constitutes the final installment of the 2000 through 2004. Multiyear deliveries of this system remain ahead of schedule. Two hundred twenty-eight million is requested for two E-2C Hawkeyes as the first of a 4-year multiyear procurement. This effort keeps the production line viable as we move to the advanced hawkeye.

Finally, we are initiating the airborne electronic attack efforts on the F-18E/F. That is an evolutionary approach to leverage the existing systems and replace our aging EA-6B aircraft. The Super Hornet allows the acquisition process to field the product to the fleet sooner and meet this critical capability need.

Finally our partnership with the Air Force and Lockheed Martin, Pratt & Whitney, and General Electric has made affordability the cornerstone of the JSF. The program is on track to deliver operational Short Take-Off and Vertical Landing (STOVL) variants to the Marine Corps in 2008 and the Navy variant in 2010.

At Secretary England and Secretary Aldridge's urging, we formed a configuration steering board for JSF. Secretary Sambur and I have a mandate to reject changes in the core program to give JSF a chance to deliver the initial system within the time and the dollars available. To further realize acquisition efficiencies, we recently signed with the Air Force a multiyear contract to procure KC-130Js to replace the Marine Corps' fleet of KC-130F/Rs. The Marines has taken delivery of nine aircraft and will have procured a total of 38 by the end of the Future Years Defense Program (FYDP).

I believe we have crafted a balanced and properly focused budget request that ensures our Nation will have an efficient and appropriately sized infrastructure. Our Navy and Marine Corps team is the most professional and capable and able force in the world. With your assistance we will continue to provide maximum capability for our sailors and marines and maximum security for America.

Thank you again for the chance to testify.

Mr. WELDON. Thank you for your statement.

[The joint prepared statement of Secretary Young, General Hough, and Admiral Fitzgerald can be found in the Appendix on page 380.]

Mr. WELDON. Admiral.

**STATEMENT OF REAR ADM. MARK P. FITZGERALD, DEPUTY DIRECTOR, AIR WARFARE DIVISION, UNITED STATES NAVY**

Admiral FITZGERALD. Mr. Chairman, distinguished members, it is a privilege to be here today to report to you on the status of naval tactical aviation, and I thank you for your continued support.

I would like to begin by providing a brief overview of the role naval tactical aviation is playing in our war in Iraq, and then I would like to go through very quickly our Navy TACAIR handbook. In Operation Iraqi Freedom, Navy-Marine TACAIR are continuing to be a critical part of the sorties flown against the Iraqi regime.

I will address carrier TACAIR, and General Hough will address the Marine expeditionary contributions to the war.

The Navy currently has forward-deployed seven aircraft carriers, five in support of Iraqi Freedom, and naval aircraft are flying approximately 50 percent of the sorties, utilizing about 75 percent precision weapons in support of the combined Air Force commander. We are using our Hornets and Tomcats in a multitude of roles, including strike, close air support (CAS), suppression of enemy air defenses (SEAD), and the addition of the Super Hornet has added additional range, on-station time and refueling capability. And what is important to point out here is the versatility and flexibility of Navy TACAIR. The Super Hornet is playing a true multirole aircraft.

I would like to shift very quickly to the TACAIR handout and talk—and highlight a few areas in there. First of all, in support of our warfighting and capitalization goals, the TACAIR Roadmap has formalized and strengthened Navy and Marine Corps TACAIR integration. We have reduced strike fighter procurement from 1,637 to 1,140 aircraft, retired 444 legacy aircraft, and delivered 257 modern aircraft within the FYDP. We will integrate six Marine Corps squadrons into our carrier air wings, and three Navy F-18 squadrons will be integrated in the Marine Corps units deployment plan. The cornerstone of TACAIR integration is to sufficiently fund readiness and modernization accounts in order to achieve these goals by using the recapitalization money available through these savings.

On the next page, the strike weapons roadmap continues, we continue to transition a more reliable and accurate lethal strike weapons inventory designed to enhance warfighting effectiveness while simultaneously working to reduce collateral damage. Our future weapons are listed on the right side of this handout, and a description of each is in the back of our handout.

On the air-to-air roadmap, the worldwide proliferation of modern fighter and attack aircraft along with the emerging cruise missile threat requires our constant attention. This roadmap focused on the complementary capabilities of the AIM-9X high oversight infrared missile and the radar-guided advanced medium-range air-to-air missile (AMRAAM). AMRAAM ensures air superiority for the U.S. warfighter and both beyond visual and within visual range.

I will quickly highlight our tactical aircraft. The Navy's Super Hornet E/F is our principal strike fighter aircraft production program. It replaces both the F-18C and the F-14 fighter aircraft. The larger weapons payload, increased range, greater carrier recovery, its sensors, links and weapons are the key to its success. The AESA radar and FLIR MIDS digital control system, which allows us to link to the ground controller SHARP Reconnaissance Pod, all contribute to the capabilities of this aircraft.

On the next page the Navy/Marine Corps EA-6B Prowler has served us well for over 30 years. However, it has structural and engine challenges, and 56 of these aircraft are G-limited. The ICAP III system will be a pacing threat technology incorporated into this aircraft as a risk-reduction measure for the EA-18G, which will receive this system.

On the next pages the Navy EA-18G is our sea-based airborne electronic aircraft of the future. It is a graceful rendezvous taking

the ICAP III technology forward from the EA-6B and using the proven F-18E/F platform. The EA-18G is a key component in the DOD system of systems approach to airborne electronic attack.

On the next page the Navy F-35C carrier-based JSF aircraft is our affordable next generation strike fighter weapon system to meet the advanced threat of 2010 and beyond. As you can see, milestones listed on the chart, we plan on flying it in the second quarter of—excuse me, the second quarter of 2007.

On the next page the Navy UCAV-N as addressed by Secretary Young is our UCAV of the future primarily targeted initially at the ISR focus and spiraling to a capability to attack—suppress enemy air defenses and then as a strike role.

On the next page the Navy E-2C Hawkeye provides a significant improved detection capability in littoral and overland environment. Our advanced Hawkeye, called the radar modernization program, will be equipped with cooperative engagement capability and digital voice analog technology to greatly enhance the integrated air picture and expanding battle space.

Sir, we appreciate the support of your committee and yield the floor.

Mr. WELDON. Thank you, Admiral.

General, the floor is yours.

#### **STATEMENT OF LT. GEN. MICHAEL A. HOUGH, DEPUTY COMMANDANT FOR AVIATION, UNITED STATES MARINE CORPS**

General HOUGH. Good afternoon, sir. Chairman Weldon, Congressman Abercrombie, distinguished members of the committee, thank you. It is a privilege to be able to speak to you today on the tactical aviation of your Marine Corps. On behalf of all the marines and families, I want to thank you for your continued support to marine aviation and the Corps as a whole. Your commitment to increasing the warfighting crisis and response capability of our Nation's Armed Forces and improving the quality of life for our men and women in uniform is central to the strength of the Marine Corps, has contributed immeasurably to our accomplishment in the global war on terrorism.

Today 85 percent of marine aviation is deployed or committed. Worldwide 59 percent of Marine TACAIR and 58 percent of our rotary wing aircraft are committed to the United States Central Command (CENTCOM) for operations in Iraq and Afghanistan with 84 Hornets, 88 Harriers, 10 Prowlers and 259 helicopters. Three F-18 squadrons are deployed with carrier wings, and one additional F-18 squadron in the workup cycle preparing to deploy very shortly.

Since the commencement of operations in Iraq, which has not been too long, Marine TACAIR from a sea base and from land has flown over 2,500 sorties and has dropped almost every type of air-to-ground munitions in naval aviation inventory. Our rotary wing has added another 800 sorties, bringing the total to over 3,300 sorties. Our 88 Harriers, there are six of them at Bagram Air Base, Afghanistan, equipped with a Litening targeting pod with its phenomenal capability has flown over 600 sorties and over 1,800 hours supporting Special Ops for Operation Enduring Freedom (OEF),



and has demonstrated expeditionary flexibility of Short Take-Off/Vertical Landing, STOVL, aircraft.

Marine aviation is healthy. I couldn't be prouder of the job our aviation marines are doing, and I thank you for your support to marine aviation. The Marine Corps aviation provides the Marine Air/Ground Task Force (MAGTF) and the joint force commander of aviation combat element capable of conducting air operations as part of the naval expeditionary force through the six functions of Marine aviation. When combined, our assets create scalable response of high force joint operations, and they are doing that today, every day.

The unique expeditionary, adaptable nature of Marine aviation is an integral part of the MAGTF and allows us to operate efficiently across the full spectrum of basing operations; makes us adaptable, highly responsive and a lethal force, as you can witness every day on your television screen. But currently we are facing a period of great change, and over the course of the next 10 to 15 years, everything that we have in Marine aviation, in fact almost everything we have in the entire Marine Corps, will change.

One thing is certain: Marine aviation is transforming and transitioning. The one thing that will not change, however, is the professionals and our expeditionary culture. This change includes TACAIR integration, aircraft transformation and transition, Marine air and command/control modernization, and the implementation of our semilinear master plan. We make every effort to increase our efficiencies and effectiveness as we go through this transformation and transition.

TACAIR integration retains our culture. It is not a new concept. It has been around for a long, long time. It is just that now we are doing it. Smaller, more capable, more affordable force ensures TACAIR support to the MAGTF. Flexibility allows global sourcing of TACAIR. We are doing it today. It makes the whole greater than the sum of the parts; bigger bang for the buck to the taxpayer, more efficiency for the warfighter, increased combat capability. Naval TACAIR, with a smaller, more efficient force, will continue to provide combatant commanders and joint force commanders with a flexible, scalable, full-spectrum response capability from the sea.

Aircraft transformation and transition: every airplane we own is going to be turned out. We are going from 23 platforms, starting 20 years ago, to 7. It is starting now, and in a mere 3 or 4 years will be in full swing, and in 12 years or so we will have completed the transition. As we transition this new aircraft, we continue to modernize our existing aircraft to ensure readiness and warfighting relevance. That is very, very important. Our key to success will be the careful balance of people, equipment that allows us to maintain combat readiness throughout as long as our readiness and transition to these new aircraft. The overarching intent is to maintain relevant forces while reducing the logistics burden on the commander.

Marine air command and control system modernization leading the fleet. Combat command and control in the expeditionary forces is absolutely mandatory to glue up the capabilities that we are transitioning to in the future. Everything in our command and control is changing. Aviation command and control continues to be a

decisively engaged in support of coalition. Joint MAGTF operation has embraced a bold vision for 2008, at which time we will begin initial operating capability (IOC) all this capability.

Marine simulator master plan, a system of network trainers that allow the aides to conduct mission rehearsal training on the terrain with actual threats they would likely encounter.

Twenty-first-century technology. It is here. We are embracing it. It makes us more efficient, more relevant and saves a lot of money. The Marine Corps and Marine aviation have clearly lived up to the reputation of first to the fight and the first to fight, and we remain ready for combat when and wherever the needs arises. Marine aviation has been and will continue to be ready to deploy a scalable, highly trained, task-organized expeditionary ace capable of conducting missions across the continuum of conflict in support of the MAGTF joint force or combatant commander, both the joint coalition environments.

In a world of diminishing host nation support and basing options and sovereignty, the ability to provide the Nation with a self-contained MAGTF capable of executing a wide range of missions at a moment's notice from a variety of locations remain the Marine Corps' hallmark. For all that and more, we thank you, and I look forward to answering your questions.

Mr. WELDON. Thank you, General, for your statement.

Dr. Sambur, the floor is yours.

**STATEMENT OF DR. MARVIN R. SAMBUR, ASSISTANT SECRETARY OF THE AIR FORCE (ACQUISITION), DEPARTMENT OF THE AIR FORCE**

Dr. SAMBUR. Thank you Mr. Chairman. Since we have a limited time for your subcommittee to ask the questions that are of interest to them, and since my oral statement is a subset of the written statement that I have given you for the record, I would like to forego my oral statement in the interest of time. But General Keys has a very brief one, and since he has not given a written statement, I would like to ask your permission for him to give his oral statement.

Mr. WELDON. You just scored a ton of points with the subcommittee, Dr. Sambur. That is worth special consideration of any requests you have in this year's authorization process. Thank you very much.

[The prepared statement of Dr. Sambur can be found in the Appendix on page 398.]

Mr. WELDON. General Keys, it is all yours.

**STATEMENT OF LT. GEN. RONALD E. KEYS, DEPUTY CHIEF OF STAFF FOR AIR AND SPACE OPERATIONS, UNITED STATES AIR FORCE**

General KEYS. Good afternoon, Chairman Weldon and members of the subcommittee. It is my pleasure here to be representing the over 700,000 total force members of your Air Force, 55,000 of whom are deployed, and many of whom are in harm's way as we speak right now as they execute CENTCOM's mission, and support and operate over 750 aircraft with over 4,800 combat sorties to date, with thousands more in combat support across the joint force.



As we face the challenges of today and tomorrow's world, we are focused on continuing to provide our Air Force with a blend of the best training, equipment and organization possible. Clearly our asymmetrical edge is our people and our technology. Every day we make the hard choices to ensure we continue to pursue three things: a balanced force; the right faces in the right spaces with the training and organization to be successful; and the right equipment to provide a balanced, modernized force, leveraged integration, building a force that can truly plug and play, whether across individual legacy systems, or clever new ideas, or hooking old things together in new ways. We must pursue the common architecture that makes us a seamless joint force.

Technology. As our adversaries turn to asymmetric strategies, we must leverage our lead in air, space and information technology to forge new asymmetric strengths of our own, whether manned, unmanned, airborne, landborne or spaceborne. These are tough issues with much debate, but you can be assured that we are engaged and will remain engaged. We will work together in continuing to forge the most professional and most powerful Air Force in the world.

Thank you for the opportunity to provide this statement, and I am ready to answer your questions.

Mr. WELDON. Thank you, General. We appreciate also your brevity.

And we will operate under the 5-minute rule because we have a second panel, and we are going to try to push this hearing along.

For all of you, what is the average age of our current tactical fighters? We know that they have been the workhorse of our air superiority over in Iraq. What is the average age? I have been using a figure of 17 years, but I would say some of you probably will come in and say it is a higher number. What is the—just go right down the line. What is the average age?

Admiral FITZGERALD. Sir, the average age of the naval aircraft are 18.4 years.

Mr. WELDON. 18.4.

Marines.

General HOUGH. Sir, TACAIR is about the same, but our helicopters are much older. For instance, the 46 is about 35 plus or minus in the 53.

Mr. WELDON. We had a hearing on that about three weeks ago, General. We made that case that our helicopter capability is woefully inadequate. Average age?

General KEYS. Depending on how you count, how they count them, but about 21 years, including trainers.

Mr. WELDON. What is the optimum age of a tactical fighter? Is it in the 10- to 12-year age range? Admiral, 10 to 12?

Admiral FITZGERALD. I would have to say it was, sir.

Mr. WELDON. Ten to twelve.

General HOUGH. Yes, sir, or greater. If you have got the older F-18s, they are approaching 20.

Mr. WELDON. So all of you have testified that the optimal age for a tactical fighter is 10 to 12 years. And we have no service providing fighters that are younger than 18 years. Is that because we didn't properly plan, or is it because there just wasn't enough money given to the services? What is the reason why our tactical

fighter inventory is so old? Each of you, in your own opinion. I am trying to recollect some history here.

Admiral FITZGERALD. Sir, I would have to say that we just haven't been procuring at the rate to do that. The Navy owns about 4,100 airplanes, and we procure about 100 airplanes a year.

Mr. WELDON. A hundred a year. What was our low point in procurement for the Navy over the past 10 years?

Admiral FITZGERALD. I don't have that number, sir, but it is below 100.

Mr. WELDON. Below 100. How far below? Wasn't there one year that Switzerland or Sweden bought more fighter aircraft than we did? Wasn't that the case? General, what is—

General HOUGH. Sir, in 1990, 1991, 1992, 1993, we—just a few.

Mr. WELDON. Just a few.

General, what is the reason why our planes are so old? You said 21 years old. What is the reason? Was it because the services didn't properly plan, execute, or is it because we didn't have enough money?

General KEYS. Well, I think it is a—as I said, it is a balanced force, and so there's only X amount of money, and it has got to be—we have got to take risks in certain areas, and as you plus up one area, you take risks in another area. And so as we have continued to build the fine aircraft we have, we have taken the opportunity to simply upgrade them rather than replenishing.

Mr. WELDON. Thank you. I try to make a point that we cannot go through a period like we just went through where we starve major acquisition platforms like tactical aviation and expect to be able to do the job with the full safety and reliability in a situation like Iraq when we basically have neglected the upgrade of our tactical aviation platforms over the past 12 to 15 years. And we in the Congress have to learn from this lesson and realize that we just can't go through another procurement holiday as we did over the past decade and expect not to pay the price for that down the road.

Let's talk about the Joint Strike Fighter (JSF). One of the successful things you are doing is bringing in the allies. I understand we have eight partners now, level 1, 2, and 3. Who are the eight partners? I know Great Britain and the Australians are involved. Who else is involved? Whoever wants to answer it.

General HOUGH. Sir, you have got Great Britain, you have got Italy, you have Turkey, you have Norway, you have Denmark, you have the Dutch. You have foreign military sales (FMS) customers which you are bringing on, and also you have Canada. And you have the FMS customers which are looking for Israel and Singapore and Australia.

Mr. WELDON. And I am supportive of that effort, and I applaud the services and the OSD for going out and getting our allies to be involved, but are we going to have any variants that are exclusively dependent on overseas sources for critical JSF parts or development activities? Can you assure us that that is not going to be the case? Secretary Young, can you assure us of that?

Secretary YOUNG. The acquisition strategy has the partner countries where they have best capabilities earning the right to build portions of those airplanes. So in some cases we will have backup plans, but I believe we will be dependent on partner countries in

some areas of the airplane to reduce the work that they have rightfully won on the airplanes.

Mr. WELDON. Critical JSF parts. These are critical?

Secretary YOUNG. That depends on the definition of critical. But again, we are holding competitions in some areas. As you know, this country will only produce elements of that airplane because of the software and mission flight control systems and other pieces, but in another areas there will be at least important components where if they have the skills, they will produce parts of the airplane.

Mr. WELDON. No, don't get me wrong. I am a big supporter of what you are doing, but that is a major concern of mine that we look at the long-term strategy of the key component parts for this aircraft as well as development activities.

I now yield to Mr. Abercrombie, if he is ready, for 5 minutes.

The gentleman from Hawaii, Ranking Member.

**STATEMENT OF HON. NEIL ABERCROMBIE, A REPRESENTATIVE FROM HAWAII, RANKING MEMBER, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE**

Mr. ABERCROMBIE. Thank you very much, Mr. Chairman. Thank you. Thank you all for your service. In some ways, Mr. Chairman, I kind of wish that the GAO section of the hearing could already be included. But let me move to the—and so I may make some reference by—I may make some references in that direction.

I am a little disappointed—I am not quite sure exactly what the position of the Marines is here. I don't know who wrote the statement, but I am sorry, it was essentially useless for this hearing. It is what my journalism teacher would have called glittering generalities. It doesn't tell us anything.

Now, the position, if I understand this correctly, particularly under the Navy's idea of new operational concepts, is that there is supposed to be TACAIR integration of the Navy and the Marines, right? Now, if the official position of both services is that integration of the air assets will enhance their readiness and the seamlessness of their operations, I am not quite sure how this affects the Marine Corps operations. How do we ensure that the marines on the ground get the support when requested? Will the marines on the ground be in control of the tactical air support under this concept, this new operational concept?

General HOUGH. Sir, the concept that has been in vogue for many, many years, and it is a proven concept, is going to be continued. It is just that in those cases when we do not have sovereignty, we don't have host nation support, we cannot go ashore, we are going to be able to do it from the sea. The same concept will prevail, close air support, the way we call in close air support, the hand-in-hand, hand-in-glove relationship between the infantry and the aviation component. The only difference is we may have to come from the sea and the sea only, but we always have the flexibility to go ashore. So there is basically no difference. In fact, what we are really doing is expanding our versatility and ability to go to war.

For instance, in Afghanistan, if we did not come from the sea, in a sea-basing concept, we would not have been able to go to war.



The only airplanes that flew those 2,000 sorties over there, they came from three Marine Expeditionary Units (MEUs) that came from the sea. We only put two airplanes ashore for 3 days the entire time simply because the distance and the availability of the runways was not there.

Mr. ABERCROMBIE. So in the judgement of the Marines, then, this is not budget-driven at all? This is strictly a question of doctrine and modernization of doctrine, if you will, particularly where tactical air is concerned?

General HOUGH. That is correct. In fact, I think we are the winners, and I will tell you why. We are going to continue doing the things we have done for, I don't know, 40, 50 years in our MAGTF, our air/ground team, for sure. We acquire a new partner, the Navy. The Navy is going to become expeditionary. They are going to sit there and prepare, if necessary, to go to war against Korea.

Also, and within the concept, going to expeditionary strike groups, where we have got expeditionary capability, where we have got not 6 Harriers, but 10 to 20, I envision the Navy is going to be there flying right alongside of us, and the whole idea behind TACAIR integration wasn't that I am going to do some of their work; they are going to do some of our work. As you know, the Marine Corps is always ready, and we fund that readiness. It is expensive, but it has paid off in spades because we are the first to the fight and the first to fight. What the Navy is going to do, and the CNO said, I am going to do this, put the money there. It is all about the money and ensuring the United States Navy, and the United States Marine Corps is always ready.

Mr. ABERCROMBIE. Excuse me. I don't doubt your resolve for a moment, but that really wasn't my question. My question is this is not budgetary, because the Navy testimony—and maybe it is not fair to put this to you. I should ask the Navy. The Navy testimony essentially keeps talking about lower overhead, and this will be cost-effective and so on, but it doesn't tell me, nor does your testimony tell me, exactly what does this mean. How are you going to do this integration? How do we authorize these funds? What precisely should we be authorizing? Are you going to—do you have a plan, a tactical plan, for this integration, because that is not in this testimony?

General HOUGH. Yes, sir, we do. As far as putting the squadrons aboard the ships, that is being worked out 5, 6, 8 years in advance. That is being done in a dynamic plan that evolves every day.

Mr. ABERCROMBIE. Okay. The reason I am asking is that still it is theoretical. This includes the JSF, right?

General HOUGH. Absolutely.

Mr. ABERCROMBIE. Okay. But the JSF, even when I look at the GAO report, is further behind than the F-22 is in terms of us being able to actually believe that you are going to be able to do the things that you are talking about. Right now the F-22 operates before—requires maintenance at such a low number of minutes, let alone hours, that it is virtually useless. So I want to understand what the heck are we exactly supposed to authorize? What do you have in mind to actually integrate? What do you really think practically you are going to have as opposed to the generalities that are in the testimony, both the Navy and yourself, with respect to what

the TACAIR integration will actually mean to the fighting men and women that you are referring to?

General HOUGH. TACAIR integration in a nutshell means funding readiness to a level that is unprecedented 100 percent of the time. When the Navy comes back from deployment, they are funded to a readiness, flight hours, and equipment and so forth where they don't take a dip, but they stay right there at that.

Mr. ABERCROMBIE. Let me ask you this then. Do you have confidence in the capacity of what is on paper right now with respect to the JSF—I will use that as a case in point—do you have confidence that that actually is going to happen?

General HOUGH. As we transition the JSF, the JSF goes aboard the boat, goes aboard ship, it is just another platform that is hopefully a leap ahead of everything else. And then the other thing is if you assume that it is late, then you are right. We have got some problems.

Mr. ABERCROMBIE. Well, not if we fund what we know works.

General HOUGH. That is correct.

Mr. ABERCROMBIE. And what is apparently working very, very well.

I am not trying to trick you. I am not trying to catch you up on something.

General HOUGH. Oh, no. I know.

Mr. ABERCROMBIE. I am trying to figure out what we should realistically do in this committee to be helpful to you and the Navy in accomplishing what seems to me on paper here to be a very commendable approach and something that is not only worthy of consideration, but we should try to accomplish. But I don't want to get off on a situation where I feel some of us on the committee feel we are, where year after year we have gone along with authorizing and appropriating money for platforms that never seem to actually make their appearance and work, whereas we already have planes, we already have systems that are working and actually have been improved, actually have had their capabilities enhanced, and maybe we should stick with that, because I am not certain that any other country, or any other power, is going to be able to match that. And maybe that is the best use of the dollar and would be most useful to you in accomplishing this interrogation.

General HOUGH. Sir, the greatest service—Congress has done a wonderful job with this, I thank you for that—is ensuring that the funds are available; that the naval air capabilities—and I am sure the Air Force, with our legacy airplanes so we can bring ourselves to the future—that those funds are made available for us to continue to keep our legacy platforms at a high state of readiness, and that the flight hours are there to fly those things, keep our pilots trained until we bridge that gap until the JSF comes back in.

Mr. ABERCROMBIE. Give me a moment more, Mr. Chairman.

In the Navy, at what point do you tell us that we should give up on these dream jobs?

General HOUGH. Sir, the JSF is going to happen.

Mr. ABERCROMBIE. I have heard that. This is my 13th year on this.

Mr. WELDON. Your 9th minute, too.

Mr. ABERCROMBIE. I am sorry.



General HOUGH. The JSF, I would absolutely strongly recommend that you get the two service secretaries and their program director over here and sit them down and bring Lockheed and Pratt & Whitney in here. Bring those guys in here and say, how are you doing, where are you, and let them answer that question.

Mr. ABERCROMBIE. Thank you.

Mr. WELDON. I thank the gentleman from Hawaii for his excellent line of questions and his usual toughness. He is a lot nicer than he appears in his questions, General.

The gentleman from Georgia, Dr. Gingrey.

Mr. ABERCROMBIE. Everything I do I do under your orders. Why don't you tell them that?

Dr. GINGREY. Thank you, Mr. Chairman. And, gentlemen, thank you so much for your testimony.

And, you know, it sounds like to me that while I firmly believe that, as Teddy Roosevelt once said, we should in this country speak softly, but carry a very big stick, we may not be doing a great job of speaking softly, but now with this Administration finally, we are—after 10 years of not carrying a very big stick, we are getting there. And I appreciate your testimony and what you are doing, and I, too, truly believe that F/A-22 and JSF will be here, and I look forward to that, and I thank you very much.

Mr. WELDON. That is it. Thank you.

The gentleman from—Mr. McIntyre is recognized.

Mr. MCINTYRE. Yeah. North Carolina. Thank you.

Mr. WELDON. I was going to say that, but—

Mr. MCINTYRE. Thank the gentleman for your testimony. I have three or four just to-the-point questions I wanted clarification on.

I noticed on page 7 of Assistant Secretary Young's report, you are talking about the JSF and the Harrier; that the JSF program is on track to deliver the STOVL variants to the Marine Corps in 2008, and the remanufacture also of the Harriers is scheduled for the last delivery in September 2003. So I guess that means there is going to be a 5-year gap from the last remanufactured Harrier to the first STOVL for the JSF. Is that correct, and do you feel comfortable with what you are going to have in that 5-year period?

Secretary YOUNG. Yes, sir. As you know, there have been significant investments, including mission computer upgrades to the AV-8B and the work, as the Congressman referenced, to make sure those systems can perform while we make sure the JSF is delivered on time.

Mr. MCINTYRE. All right. And I guess the great standby of the F-14 Tomcat, it has been reconfigured, I understand, from air superiority to also include the strike fighter bombing that it has been doing and has been very successful in its missions; is that correct?

Admiral FITZGERALD. Yes, sir. We put a land pod on the Tomcat in the early 1990s. That airplane has been extremely effective dropping precision-guided munitions, laser-guided bombs, and we have just recently added a GPS capability, so it also drop the Joint Direct Attack Munition (JDAM) 2,000-pound weapon.

Mr. MCINTYRE. What is the average age of the F-14 Tomcat in service now?

Admiral FITZGERALD. Sir, they were put in service in the—starting in the early 1970s, the last ones built in the mid-1980s. So you

have a whole swing of age there, but somewhere earliest probably about 18 years old; the oldest, 25, 26 years old.

Mr. MCINTYRE. So we would still have some F-14s in service that are 25- to 26-year-old planes; is that correct?

Admiral FITZGERALD. I have to take that one for the record, but somewhere in that vicinity.

[The information referred to can be found in the Appendix beginning on page 471.]

Mr. MCINTYRE. Okay. All right. And a technical question. The JSF is designated F-35, which is quite a jump from F-22. Are there several other variants that were not adopted? Why there is such a big gap in the F designation? Nobody's ever been able to tell me the answer to that.

General HOUGH. Sir, I will tell you the truth. When they made the announcement, and Secretary Roche said, what is the name of this airplane, they said, it is F-35.

Mr. MCINTYRE. There was no reason as to why it jumped from F-22?

General HOUGH. None whatsoever.

Mr. MCINTYRE. Okay. Appreciate the honesty. And I am also pleased to see the efforts for the airborne electronic attack on the F-18F to replace the Prowler.

Let me ask you, are the efforts to do that going well? EA-18 would be the new designation of that; is that correct?

Admiral FITZGERALD. Yes, sir. It is the EA-18G, and what we are doing is a spiral development where the pods for that airplane are being developed and put on EA-6BS, called the ICAP III. Those pods and about 75 percent of the avionics will transfer over to the EA-18G. The EA-18G is actually an F-18F airframe that has got additional equipment on it.

Mr. MCINTYRE. All right. And one last question, Dr. Sambur. Page 11 you mention about the F-35 replacing the F-16 and A-10. We have quite a lot of A-10s out of Polk Air Force Base down in my part of North Carolina, and Congressman Hayes and I share representation of that area. What is the average age of the A-10s, the Warthogs or Thunderbolts that are being used now; do you know?

Dr. SAMBUR. We will take that for the record. We don't have that.

[The information referred to can be found in the Appendix beginning on page 471.]

Mr. MCINTYRE. Okay. But their capability is still performing quite well despite their age in the current conflict, correct?

Dr. SAMBUR. Yes.

Mr. MCINTYRE. Okay. Thank you very much.

Thank you, Mr. Chairman.

Mr. WELDON. Thank the gentleman.

The gentleman from South Carolina Mr. Wilson is recognized for five minutes.

Mr. WILSON. Thank you, Mr. Chairman. I would like to thank all of you for what you have done and what you are doing to provide for a strong country. And then the particular efforts, I have been particularly impressed in that I had the opportunity to be aboard the USS Abraham Lincoln in November, and that was an extraor-

dinary opportunity for me, and I am also very proud with Navy, Marine and Air Force personnel that I have a son who is in the U.S. Navy at Bethesda, and I have a nephew at Langley. And that is pretty self-admissioned on my part because I am with the National Guard and have two other sons in the Army National Guard, but—

Mr. WELDON. What about the Marines?

Mr. WILSON. I don't cover the Marines as well as I should. Okay. But my late father-in-law was a Marine captain and was awarded the Navy Cross at Okinawa.

Mr. WELDON. What about the Coast Guard?

Mr. WILSON. I don't cover the Coast Guard. I grew up next to the Coast Guard in the holy city of Charleston.

But what you are doing is so important, and I am really proud, too, to represent the Marine Air Station there in Buford, and I have had the opportunity to participate in the flight simulator for the F-18. With this background, I—and, General Hough, you in particular mentioned change. Part of that would be with the JSF and the new capability of unmanned combat air vehicles (UCAVs). And with that capability, what would be—do you see, or anyone else who might want to answer this, the balance between the JSF and UCAVs?

General HOUGH. Sir, the future there of course has been looked at, and it has been envisioned as a concept, but you have got to build the JSF to make it fly. It is about interoperability, it is about controllability, and it is not, I don't think, this day and age to think that you could take a JSF with its interoperational capabilities to, say, command a fleet of four UCAVs to do the kinds of things—put them in harm's way instead of putting a person in an airplane. And people have looked at that. What they must do first is the 10-year leap with the technology and so forth. I firmly believe they are on good track to develop that airplane on time, but, however, UCAVs may be a little ways out there past that, and it is—they are working very aggressively, from what I understand.

I went out to Edwards and took a look at it, looked at the controllability. They are doing great work, but until they get the two capabilities—you have to have them. Then you can mesh the concept of what can you do to these things together to make them more efficient.

Mr. WILSON. Would anybody else like to comment?

Admiral FITZGERALD. Sir, if I could comment, the UCAV has to earn its way onto an aircraft carrier is our view in the Navy. In order to earn its way on, we first looked at what the initial was where the UCAV could play an active role in our tactical concept, and we saw that role as being in the intelligence-surveillance-reconnaissance (ISR) area in a high-threat area. So that is the first area that we want to look at with the UCAV, and that is where it is being designed right now.

We see the capability to spiral that capability to going after enemy air defenses, and then ultimately in delivering strike weapons. That is going to take an awful lot of onboard processing and artificial intelligence to do, which that capability just isn't here today. So, as General Hough was saying, you still need a man in the loop, particularly in the cockpit, to make some of these rapid



battlefield decisions, and we see the JSF being that capability and complementing that capability, with the UCAV being able to provide that battlefield intelligence. And also, as I said, in further capability, developing the strike weapons and that capability, ultimately you may end up with a totally unmanned force, but that is not in the near future.

Mr. WILSON. Thank you very much.

And for General Hough, too, I am really proud that we have the Marine Aircraft Group 31 at Buford, and I was there last weekend for a support rally. Additionally, the community there is just so supportive of providing gifts for the children of the persons deployed. And I want to reiterate something that you brought out a minute ago, and that is that the Marine Fighter Attack Squadron 251 and Navy Strike Fighter Squadrons 82 and 86 performed so well in Afghanistan and delivered to the Taliban and al Qaeda 1.3 million pounds of ordnance.

With that, I would like to know, General, about how the Navy and Marine Corps TACAIR integration plans could impact the Marine air station at Buford?

General HOUGH. Sir, it is only going to make it better. As you well know, there is two Navy squadrons, Cecil, at Buford. Sailors and marines have demonstrated that TACAIR integration works very, very well. Those are all boat-bound squadrons. They drink from the same trough whether they are ashore or they are afloat. They are brothers in harm's way. They have learned to work with each other integrally across the board. They understand how each other works. But the most important thing is they have respect for each other's culture in that the Navy understands the expeditionary needs of the Marine Corps, and the Marine Corps understands the boat needs of the Navy.

They can swing either way, given the versatility and flexibility that we have not had for years. I see only a furthering of this, and that is a matter of leadership, and for Mr. Abercrombie, money.

Mr. WELDON. Well, they greatly appreciate it.

I thank the gentleman. The gentleman from the great State of Corpus Christi, Mr. Ortiz, is recognized.

Mr. ORTIZ. Thank you, Mr. Chairman. I am sorry I was late, but we are marking up in the Natural Resources Committee. We want to welcome you to this committee hearing today.

Mr. Secretary Young and Admiral Fitzgerald, you know, it is imperative for us to keep the training of our naval aviators current. In this regard, I am pleased to see a push in the budget to purchase more—I don't know how many T-45s—but I think it is a few of them. And I agree with this effort because it would allow us to make the most of our funding by obtaining a lower cost per unit because we are buying more planes.

At the same time we are running into obsolescence issues with the T-45 that dramatically increases our maintenance costs. The current fiscal year 2004 budget funds 339 million for the purchase of 15 T-45s. It is my understanding that this is 13 million short of the funding necessary for the purchase of the 15 T-45s.

I am also under the impression that there is no funding in the budget for addressing the overall obsolescence issue. I understand that \$22 million is needed to begin the upgrade. I don't know how

we stand in that funding, whether you are going to be able to find what is needed.

Then my next question would be, since we are at war, is the training that we are providing them now under the old means adequate, once they move to a fighter from the carrier? Maybe you can explain that to me. I was in the Army.

Admiral FITZGERALD. I will try to explain it for you, sir.

Everything you say is true. We have a shortfall in ancillary equipment. The equipment that actually goes on the airplanes for the T-45s. We have an obsolescence issue, which we unfortunately are not able to address in this budget for affordability reasons, but is on our unfunded requirements list.

I believe that those issues are all going to be—we have to address all of those issues with the TACAIR integration plan.

We know that we have to relook at how many T-45s we need to buy to make our pilot throughput work for that plan. We also know that the T-45As have an obsolescence problem, as to the T-45Cs. We need to address that issue so that we have a digital cockpit in the future for that airplane. As I said, those issues were deferred in this budget and are on our unfunded list.

Mr. ORTIZ. By waiting until the next budget, how much more are you going to have to pay? Because every time you wait and don't buy these planes, there is an increase in cost. It could be the material that they build them with, it could be the labor factor.

So I think that by waiting it is going to be more expensive. It might be more than \$339 million. How are you going to address this problem?

Secretary YOUNG. I think, as was pointed out earlier, it is a resource issue. We budgeted what we believe we can fund, and with some effort, the number in fiscal year 2004 is higher than was in the fiscal year 2003 Future Years Defense Program (FYDP). And we will continue to look at the issue as the Admiral said. The requirement is more substantial, but we believe we have taken a step in increasing the number this year. We have priced them as reasonably as we can.

You are right. Future years it could cost more, but we will work with the company. We have worked with them very successfully to keep the price down at these rates of procurement, so we can try to buy to the needs as funds are available.

Mr. ORTIZ. So let me see if I understand this correctly. We have been talking about 15 planes. None of them would be for this year's budget?

Secretary YOUNG. The 15 planes are in this year.

Mr. ORTIZ. They are in the budget?

Secretary YOUNG. Right. There are eight planes in 2005. So there are additional planes continuing.

Mr. ORTIZ. I guess I have a yellow light.

Now, when they finish their training at either Kingsville or wherever, you know, are those young pilots assigned to an aircraft carrier? Are they ready to go fight a war?

Admiral FITZGERALD. Yes, sir. We have been training pilots on these airplanes for a long time. We have very high confidence in the T-45, in fact, our entire training system. When those pilots graduate from that airplane, they go out and get additional train-



ing in the airplane that they are going to fly in the fleet. By the time they get to the squadron, they are a full-up round, they are ready to go to war.

Mr. ORTIZ. Thank you so much. We appreciate the fine work that you gentlemen are doing for our country.

Mr. WILSON [presiding]. I want to recognize the next person, the great Representative from New Jersey, Mr. LoBiondo.

We are very proud that it is his air Guard/Reserve units that are providing the air cover for Washington.

Mr. LOBIONDO. Thank you, Mr. Wilson. Welcome to our panel. Thank you for being here.

The foregone conclusion is that missions in Afghanistan and Iraq are increasing the tactical number of hours per year on our airframes, not to mention what we are doing with homeland security.

I know in the case of the 177th Fighter Wing, the tremendous increase again in the number of hours that they are flying. I have serious concerns about the future status of our F-16 fleet, and the fact that it comprises, as I understand, about 50 percent of the precision fighter force right now.

The Air Force, and correct me if I'm wrong please, General Keys or Dr. Sambur, is no longer buying or has the line up and running on the F-16s. We are looking at the JSF, but coming on line further down the line. Because of the number of hours on the F-16 airframes, and just because of almost normal attrition, we are losing a number of them every year.

I think we have got a problem, and I can't seem to get an answer from anyone of what, if anything, are we doing to fill the gap for the service life extension. There is going to be a point at which, unless I am wrong, that we are not going to be able to keep F-16s in the air. Domestic or homeland security or overseas missions, whatever the case may be, these birds are going to come out of service, and what is our plan to keep them up, or how are our Guard units going to react?

Can you give me any insight into that, General Keys, Dr. Sambur.

General KEYS. I would say that the data that we get daily, which we track very closely, on the Fully Mission Capable (FMC) rates, the supply rates, the maintenance hours per flying hour rates, in fact, don't indicate to us that the F-16 is going to drop off the operating world any time soon.

In fact, we have put a good amount of money into upgrading the capabilities of the F-16 so that we have a more uniform capability across the force when it comes to delivering precision weapons. That is including the SADL, the Link-16, the precision targeting pods, so that we can blend those forces together much more easily.

We believe that the F-16 will be viable until we get the JSF. That is our current assessment of the health of the fleet.

Dr. SAMBUR. The data that we have suggests that it will be available through 2020.

Mr. LOBIONDO. Well, what I would like to do, Mr. Chairman, if it is possible, is submit to Dr. Sambur, General Keys a follow-up, maybe a little more in-depth question from my understanding of presentations that I have received, about where we are, the bath

tub that we are going to be facing, and how we address that gap on the in-between.

Because either I have been—I have misunderstood what has been presented to me or there is some kind of a disconnect between what I have been told and what I am hearing from you, and I would just like to try to resolve the differences.

I don't think we can do it today, but if it is possible I would like to submit for the record, and then maybe we can engage in a little bit of dialogue after that.

Dr. SAMBUR. Right. If you feel it necessary, we will come to your office and give you a more in-depth briefing and answer your specific questions, if that is agreeable.

Mr. LOBIONDO. That may very well be the case. That would be helpful. Thank you.

Mr. WILSON. Thank you. And now, Mr. Abercrombie.

Mr. ABERCROMBIE. I pass.

Mr. WILSON. Secretary Sambur, the Air Force is requesting \$12 million for a new start called the Common Aero Vehicle program. Can you explain what the program is intended to accomplish?

Dr. SAMBUR. I would have to take that question for the record. [The information referred to can be found in the Appendix beginning on page 472.]

Mr. WILSON. And Secretary Young, could you tell me about the High-Fly Program, what it is and the budget for the program?

Secretary YOUNG. I can answer in more detail on that for the record. I know what it is.

An OSD initiative, that is joint with the Navy and the Air Force for a hypersonic flight demonstration vehicle. We will get the details of the budget requests and the timeline for it. I don't have that with me.

Mr. WILSON. Now, I will defer back to the actual Chairman.

Mr. WELDON [presiding]. I thank my friend and colleague representing all services for sitting in.

And, gentlemen, I want to thank you.

We do have some questions that we are going to submit for the record in the interest of time. So you get off easy today because we were late starting, and so all of the tough questions will be in the record. We ask you to respond to us.

We appreciate your continued efforts and your service to the country. We really appreciate that. And on behalf of all of my colleagues, we say thank you. So you are all dismissed.

Our second panel will address the F/A-22 program. The F-22 has been in development for nearly 12 years, with a low-rate production decision having been made in 2001.

While intended to provide a number of impressive combat capabilities, the program continues to face difficult development and production issues. In 1992, the approved program, in constant 2003 dollars, was programmed to deliver 648 aircraft at a program unit cost of \$115 million per aircraft.

Now, 11 years later, the program buy is projected to be 276 aircraft, at a program unit cost exceeding \$250 million per aircraft. This constitutes a nearly 60 percent decrease in the number of aircraft and well over a hundred percent increase in price.

The development costs recently was reported to have increased another \$876 million. This has impacted the fiscal year 2003 planned procurement, reducing it by three aircraft from 23 to 20.

In addition to cost problems, development problems persist. The avionics software continues to be unstable, and excessive vertical stabilizer vibrations are experienced in certain flight regimes that if uncorrected would reduce aircraft service life.

The Air Force continues to state that it has planned production investments that will result in efficiencies, that will result in reduced costs, and ultimately to the procurement of more aircraft. Yet the Air Force reportedly has underfunded the investments required to achieve the promised production efficiencies.

With us to address these and other issues are Lieutenant General John Corley, Principal Deputy Assistant Secretary of the Air Force, and Allen Li, Director, Acquisition Sourcing Management, U.S. General Accounting Office.

Before beginning, does the gentleman from Hawaii have any additional comments he would like to make?

Mr. ABERCROMBIE. No, sir.

Mr. WELDON. General Corley, without objection I would give you the floor time, as well as Mr. Li, and ask you to make whatever comments that you would like to make. Thank you.

**STATEMENT OF LT. GEN. JOHN D.W. CORLEY, USAF, PRINCIPAL DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE (ACQUISITION)**

General CORLEY. Thank you, Mr. Chairman and distinguished members of the subcommittee.

We appreciate the opportunity to appear before you today and discuss the progress, demonstrated progress to date, on the F/A-22 program.

Clearly, I want to thank you for your continued support of the F/A-22 program, and your broader over arching support of the Air Force modernization roadmap.

I also believe it important to underscore and thank you, sir, for the support of our Air Force airmen as well as all service members that continue to contribute in Operation Iraqi Freedom.

Joining me today, on my right is, Brigadier General Rick Lewis. He is the Air Force Program Executive Officer (PEO) for the fighter/bomber programs. He brings a wealth of operational and strategic experience to the program. He is going to lead us through the remaining challenges on the F/A-22 program, and with your support, toward a full rate-production decision and our declared initial operational capability (IOC), sir.

My comments today are very brief. I will limit those. We will focus exclusively on the over-arching principles behind combat that have driven the F/A-22 program's requirements and its successful development to date.

General Lewis will then take you through the program specifics. He will provide a snapshot of the development, the tests and the production aspects of our efforts.

Clearly, sir, this great Nation has afforded me some wonderful opportunities. Those opportunities include the chance to command



at squadron, group and wing levels, plus a unique chance to serve in the combined air operations center at Prince Sultan Air Base.

I can assure you from these experiences that achieving air dominance is really the first priority of any combatant commander, because with air dominance, our forces are given the freedom from attack, the freedom to maneuver, and the freedom to attack.

Absent the F/A-22, our ability to execute future joint and coalition war plans will be placed in jeopardy, sir. As you are very much aware, the world has changed. It continues to change very rapidly with potential adversaries who have not stood idly by. Enhancements and new technology have created a cache of inexpensive and new technologies that provide deadly weapons that are available in the world market today to regimes that will, if they have the money, pay for them.

Advanced surface-to-air missile systems, along with high-powered radars, weapons that could provide a variable curtain, if you will, around highly sensitive targets. This is principally due to the fact, and the inability of legacy aircraft to evade detection and, unfortunately, possible destruction from the surface-to-air missile (SAM) systems.

The F/A-22, however, has the unique ability to not only penetrate those anti-access threat arenas, but also to suppress and to destroy these systems and thus open the door, sir, for follow-on forces of the joint and coalition variety.

The same is really true of advanced enemy fighters that were discussed previously in the panel. Some aircraft, enemy aircraft, advanced enemy aircraft, have reached parity with our legacy aircraft. The F/A-22, however, can outperform, it can outclimb, it can outmaneuver, even the most robust enemy aircraft that are envisioned and are arriving in quantity today.

The F/A-22, coupled with its robust weapons-carriage capabilities, advanced avionics will provide the dominance this Nation needs from day one. That is going to enable us to further target elimination of weapons of mass destruction. It also applies to theatre ballistic missiles, classically guarded by concentric rings and depth. No viable target will be safe from destruction from F/A-22s or the forces it enables.

This rings true of homeland defense, sir, as it does elsewhere around the globe. Nothing is more important than keeping our Nation safe. Rapid reaction times and high-speed cruise capabilities unique to the F/A-22 make it the capable air defense platform. It can detect, it can intercept and destroy enemy cruise missiles at sufficient ranges to maintain a safeguard for our cities and our populations.

We must also leverage the time and the money already spent on this aircraft to fulfill that priority mission for our citizens. I have alluded to the anti-access threats, sir, that the F/A-22 brings to the combatant commander, but what I haven't mentioned, is the leverage of previous dollars of investment you have so graciously afforded us from the Congress; investment in aircraft like the B-2 and the F-117 that continue to perform so magnificently.

We need to no longer force them to be relegated only to night operations, but to bring their stealth and their capabilities into the daylight. By the fielding of the F/A-22, stealth will now enter the

daylight, and the deployment of our fighter and bomber fleet, without regard to time or condition, will further open the door for joint and coalition efforts and the rapid destruction of enemy defenses.

The F/A-22 is the linchpin for this Nation, sir, in ensuring air dominance.

Now, with your permission, sir, I would like to ask General Lewis to provide you with the details of our ongoing efforts that demonstrate the success of this critical weapons system and getting it into the warfighters.

[The prepared statement of General Corley can be found in the Appendix on page 417.]

Mr. WELDON. General.

#### **STATEMENT OF BRIG. GEN. RICK LEWIS, AIR FORCE PROGRAM EXECUTIVE OFFICER**

General LEWIS. Mr. Chairman and members of the subcommittee, thank you for the opportunity to share the status of the F/A-22 Raptor Program. I would also like to share my status for just a moment. I am just a fighter pilot with war time experiences from Desert Storm and Allied Force.

The Secretary of the Air Force and Chief of Staff of the Air Force put me in this job last November, 5 months ago, in order to reestablish confidence and credibility in the F/A-22 program. And every day I strive just to do that.

I will confine my opening comments to the two charts up on my right. Both the development and production aspects of the program are doing well. We have seven Raptors flying almost daily at Edwards Air Force Base. In fact, these jets have accumulated over 3,000 hours to date.

In the summer of last year, we recognized the need to make changes in how we are executing the envelope-expansion, testing in order to clear the full 9-G envelope before the end of the scheduled development program.

Working with Lockheed-Martin, we put a new plan in place, and we have been executing a two-and-a-half fold increase to our testing rate over the past six months.

Of course, the Raptor is first and foremost a weapons system. To date, we have successfully fired 16 missiles, four of which were guided. It is important to note that one of these shots last November was an Advanced Medium-Range Air-to-Air Missile (AMRAAM) shot at supercruise.

In the future, we will drop JDAM, a precision-guided, air-to-ground weapon at supercruise. It is these unique capabilities that will make this aircraft so deadly.

To prove the robustness of the airframe itself, we have completed static and first-lifetime fatigue testing. We have dedicated an airframe that we use for these tests. In static testing, we load the airframe up to one and a half times its designed strength requirement and observe over long period of time how well the airframe holds up.

In fatigue testing, we simulate hours and hours of flying loads and movements to determine durability. These tests are done early in an aircraft's development to uncover potential redesign or retrofit issues up front. We have found no major issues from either test.



In the case of lifetime testing, we are already 38 percent complete on the second life.

The challenge that confounded us for a while and ended up requiring additional flight test hours was the characterization of the jet's fin buffet response. Fin buffet is the air flow phenomena that occurs in all twin-tailed fighters. It is a complex issue. We studied it, we tested it, and we fixed it. The fix resulted in minor and inexpensive modifications.

The only thing we need to do on fin buffet is verify the region below 10,000 feet. We also resolved an issue with window noise, something we called canopy howl, and that also, at first, looked tough.

This program is tackling technologies others have never faced, and we are getting it done. Today we are attacking an avionic stability issue the same way. Recently, we made fundamental changes in our avionics development efforts. I am confident, that like fin buffet and canopy howl, resolution of avionic stability is not a matter of if but when. Resolution will be in the months ahead.

In our production program, we are also getting it right. The operation on the production floor at Marietta is rapidly gaining momentum. As expected in any production program in its infancy, we have had growing pains which have manifested themselves in late aircraft deliveries.

To address these late deliveries, we have been working closely with Lockheed-Martin to implement a number of initiatives to reduce build-cycle time. The changes we have put in place are making very visible impacts. During the calendar year 2002 alone, Lockheed reduced late aircraft deliveries from 12 months late to 7 months late.

At the current rate of improvement, we expect aircraft deliveries to be back on contract schedule by July 2004. In January, we took delivery of the first operational aircraft, 4012, which was delivered to air combat command at Nellis Air Force Base. We launched, flew and recovered 4012 using only operational personnel.

But aircraft deliveries are just one part of the picture. Cost is very important to us. That is why we are focused on production affordability. In September 2001, as part of his low rate initial production decision, the defense acquisition executive, Secretary Aldridge, approved the Raptor production programs buy-to-budget strategy, along with the production budget cap of \$43 billion.

We are fully committed to this buy-on-the-budget strategy. Our current production projection is that we can procure 276 Raptors for \$43 billion. This estimate is based on actual lots on contract through lot 3, and a set of conservative cost-estimated assumptions that include realistic return multiples for our future cost-reduction initiatives, known risk areas, as well as a 5 percent factor for unknown unknowns.

While our current estimate is 276 Raptors, we are not satisfied, we need more, and we are pursuing ways to improve program affordability. Production stability is vital to achieving future program affordability goals. Supplier confidence is an absolute got-to-have for the program's success, because 65 percent of the Raptor lies with the suppliers.

Now, would be the worst time to decrement production funds. We are at a critical stage in the production ramp and the affordability learning curve. For the first time, the tools, training and people are in place for an orderly ramp-up to max-rate production.

We need to keep the momentum going and show commitment. I want to thank the committee for your steadfast support to that end.

The second key to achieving affordability is much more explicit, we call it the production cost reduction program. It is a key enabler for maximizing quantity. To show our commitment to this program, we have invested \$475 million, including \$85 million in fiscal year 2004 in producibility improvements.

When we first established this program, we said we would invest \$475 million. We have not wavered from that commitment. I think it is important to recognize that the ground we are paving on the Raptor, in many ways, enables our future force. The F/A-22 is developing and implementing state-of-the-art technology, fusing leading-edge capabilities and pioneering manufacturing techniques that will ultimately yield not only the world's greatest aircraft, but also establish an invaluable set of lessons learned for developing future complex weapons systems.

The F/A-22's kick-down-the-door weapon system is the pathfinder. We have to get it right. Of point, this is the only U.S. aircraft that will put a weapon on target this decade. The F/A-22 program is gaining momentum. We can't let up now. I would like to personally commit to maintaining an open dialogue with this committee.

Thank you for this opportunity to provide you this update.

Mr. WELDON. We thank you for your statement.

Mr. Li, we will enter your statement in the record. You may make whatever comments you would like to.

#### **STATEMENT OF ALLEN LI, DIRECTOR, ACQUISITION SOURCING MANAGEMENT, U.S. GENERAL ACCOUNTING OFFICE**

Mr. LI. Chairman Weldon, Ranking Member Abercrombie and Dr. Gingrey, members of the subcommittee, I am pleased to be here today to discuss GAO's work reviewing the F/A-22 development and production programs.

With me today are Don Springman and Marvin Bonner from my Dayton team. As requested, I will highlight my prepared statement. I understand and can appreciate General Corley's and General Lewis's enthusiasm for the F/A-22. The Raptor certainly has the potential for being the most advanced air-superiority aircraft ever to join the Air Force's inventory.

The Fiscal Year 1998 Defense Authorization Act requires GAO to annually assess the F/A-22 development program and determine whether the program is meeting key performance, schedule and cost goals.

We have issued six of these annual reports to the Congress. We have also reported on production program costs over the last 3 years. Most recently, we reported on production and development activities in February and March of this year respectively. My re-

marks today stem from this body of work. I will make four points this afternoon.

Point number one, progress is being made to demonstrate performance, but testing is needed to verify that fixes will work. Estimated performance in the areas of supercruise, acceleration, maneuverability, radar observability, combat radius and range in searching targets have to date been met or exceeded by the Air Force.

However, problems have surfaced related to overheating during high-speed flight testing, reliability, avionics and excess movement of the vertical tails. Modifications are being made to some test aircraft to address these problems. The Air Force needs to complete operational testing to ensure that it has these problems under control.

Point number two. Continuing to acquire aircraft before adequate testing is a high-risk strategy that could serve to further increase production costs. Despite continuing development problems and challenges, the Air Force plans to continue acquiring production aircraft at increasing annual rates.

Since 2001, we have reported this as a risky strategy. The Air Force runs the risk of higher production costs by acquiring significant quantities of aircraft before adequate testing is complete. Late testing could identify problems, requiring costly modifications to achieve satisfactory performance.

Point number three. Increasing costs underline the importance of taking full advantage of all opportunities for gaining manufacturing efficiencies during production. Currently, the F/A-22 program is both in development and production. A congressional cap was initially put on both development and production.

The cap on development was removed in December of 2001, the cap on production remains and today stands at \$36.8 billion. DOD's current production estimate of \$42.2 billion for 276 aircraft exceeds the production limit by \$5.4 billion.

Over the last 6 years, the Air Force identified about \$18 billion in estimated production cost growth. To counter that growth, the Air Force and its contractors have identified and implemented a number of cost-offsetting efforts known as production cost reduction plans. Cost offsets of over \$1.9 billion have already been implemented in the first four production contracts awarded.

One type of production cost reduction plan is the production improvement program. Examples of production improvement programs previously implemented by the Air Force include manufacturing process improvements for avionics and improvements in fabrication and assembly processes for the airframe.

We reported in February that the Air Force reduced funding for production improvement programs in fiscal year 2001 and 2002 to cover cost growth in the first two production lots, but this reduced funding can have a negative effect on future production costs.

Now, why is that? Well, these cost-offsetting efforts focus specifically on improving production processes. For the majority of these programs, the government makes an initial investment to realize savings. So the earlier the Air Force implements them, the greater the impact on reducing the cost of production.



Our concern is that such reductions do not occur in fiscal year 2003 and beyond, since the Air Force is counting on the billions of dollars in cost offsets these programs would generate. I am heartened to read this afternoon, in the general's statement, that the Air Force is currently addressing this concern.

My last point. F/A-22 cost increases may have a broader effect. Since development has started, the projected number of aircraft to be produced has decreased from 648 to 276. This reduction may have a negative effect on the service's long-term plans to modernize its tactical aircraft fleet.

In 2001, we reported that even factoring in the acquisition of F/A-22s, the average age of the Air Force's tactical fleet would be 21 years in 2011. This is almost twice the Air Force's average age goal of 11 years.

Aging aircraft in general take more time, work and money to keep airworthy and mission ready. The F/A-22 will be operational late 2005 at the earliest. The rate of replenishment, F/A-22s, replacing F-15s for example, will be substantially lower due to the decrease in the number of aircraft to be purchased.

If I can deviate for just a moment from my written short statement. A question was raised by several Members in the earlier panel about the average age of aircraft. About 2 years ago, Mr. Chairman, I had a team that actually looked at that just before the Quadrennial Defense Review, (QDR) was completed. We issued that report to Secretary Rumsfeld because we felt that he should have some data on what those average ages were.

For example, for the F-14 A B and D, the average age with 1999 data was 15 years. That was the average age. Another question was asked about the A-10 Warthog. That was 18 years in 1999.

Mr. Chairman, that concludes my statement. I would be pleased to respond to any questions you or other Members may have at this time.

Mr. WELDON. Thank you, Mr. Li, for your statement and for your excellent work at the GAO. We really appreciate the efforts. It helps us better understand the concerns that we have to address.

[The prepared statement of Mr. Li can be found in the Appendix on page 449.]

Mr. WELDON. General Corley, the congressional cost cap on the F/A-22 is \$36.8 billion, yet the current program estimated cost is \$42.2 billion. If the Congress does not remove its cost cap, how many F/A-22s, given current cost projections, will the Air Force be able to procure?

General CORLEY. Less than the requirement, sir. And clearly, after that Defense Acquisition Board (DAB) in August of 2001 that examined a potential for \$43 billion, the Air Force does recognize that that is \$5.4 billion above the current congressional cap.

We have informed the defense committees. We have been working with OSD, and we continue to request your consideration of relief from that cap, sir.

Mr. WELDON. But how many aircraft would it be? Have you done that estimate?

General CORLEY. I have not, personally, sir. We can take that for the record. It would be some number less than the requirement.

Mr. WELDON. Mr. Li, have you done that analysis?



Mr. LI. We have done just a back-of-the-envelope assumption. And my assumption, sir, would be in the 220 range.

Mr. WELDON. Two hundred twenty. General Corley, in 2002 the Air force announced it uncovered further cost growth in the engineering and manufacturing development (EMD) program of \$876 million. Do you believe that this cost overrun will capture all additional costs to complete development?

General CORLEY. Sir, we have a great degree of confidence that \$876 million will complete our EMD program. Again, that is an estimate at completion of the engineering manufacturing and development on the aircraft itself.

Further, sir, I would like to, with regard to cost on both development and most especially with production, these are all estimates, sir. The one thing that we have seen is the instability in the program.

We believe that is a great contributor to the increases in the cost itself of the program and ultimately drives down the number of aircraft that you can procure for a fixed number of dollars.

Mr. WELDON. Mr. Li, do you agree that the 876 is a valid number?

Mr. LI. I believe—

Mr. WELDON. Do you believe that will capture all additional costs, or do you believe it is going to be higher than that?

Mr. LI. I believe that we would still need to take a look at their burn value management reports in order to make that particular projection. My last look at those particular reports indicates that the contractor is still exceeding that amount which was projected.

Mr. WELDON. My third question, General, deals with the software development program. This is an amazing amount of money that we are spending on this aircraft. I understand that—I think I was told that there is a mean time between failure of 1 hour, where the software just cuts out.

Is that, in fact, correct? And what is your estimate of time and cost to correct it?

General CORLEY. Sir, I would like to ask General Lewis to talk about the specifics of the progress we have made to date and where we stand with regard to the hours on avionics stability.

General LEWIS. Sir, the 1 hour we initially—it is two steps to this answer. One, in December, we had—the objective was 1 hour in the airplane. We took the software to the laboratory. We got 1 hour in the lab. Sure enough we got 1 hour in the airplane.

Our objective in the January release was to have—we thought we would get 8.8 hours. When we got to the airplane, we still had 1 hour, and so we have a difference between the aircraft hardware and the labs.

Mr. ABERCROMBIE. Excuse me, General. Can you tell me what you mean exactly by 1 hour?

General LEWIS. That is the time that you have a stability such that the avionics hardware will have to be reset. In other words, a function will have to be turned off and turned back on.

Mr. WELDON. So in other words, as I understand it, the avionics crashes within an hour?

General LEWIS. Yes, sir. There are various levels of crashes, and we consider these the significant ones in an hour right now, today.

Now, what we found out——

Mr. WELDON. Who is the software developer for the platform? I know it is Lockheed in general, but who is developing——

General LEWIS. Lockheed/Boeing is the integration, and also Northrop Grumman are the key folks in this.

Mr. WELDON. They better get their act together, because this is outrageous that it crashes. When we are spending all of this money for an airplane, and the software system crashes within an hour, I mean, cut me a break. Are they in the room? I mean, good grief.

General LEWIS. Sir, it is not all their fault. What we found——

Mr. WELDON. Whose fault is it?

General LEWIS. We formed a special team in OSD to help us, with Dr. Sega. And we took the industry's best on the science and technology from the universities, plus all of the industry, people off SBIRS, Joint Stars, all of that. They went and looked at our procedures for software development. They are helping us today.

We found down in—the main contributor was the interpretation of the National Security Agency (NSA) regulations for how you can capture data off the F/A-22. The data it generates is so supersecret that the software developers felt they could not put in the computer development tools built into the software, because the NSA said you can't capture that data in realtime.

So they have been living with this for 2 years. When a bug comes up, they have been trying to sort out, without the proper tools, of how to fix it. We have turned that around.

It was a bad interpretation of the NSA laws guiding in this software development. The tools are being implemented right now as we speak. We have them on one jet.

So on this one jet, we have gone from 1.24 hours up to 3 hours, and we don't have all of the development tools in there. We are back on the track now to get this resolved, and we will have this fixed here very soon.

Mr. WELDON. So has it been NSA's problem?

General LEWIS. It wasn't an NSA problem. It was an interpretation of the rules for software development by the company.

Mr. WELDON. Maybe it is because I am not a scientist, but this whole thing sounds ridiculous to me, that the software for this brand new aircraft crashes after an hour and we can't get it straightened out. We keep seeing the cost increase for this program drive through the ceiling. It is beyond the ceiling, it is up in outer space.

How long have we had this problem? Two years?

General LEWIS. Sir, this problem was identified last summer. As part of the—as part of the management schedule changes is that \$876 million, and we have management reserve in there with time to fix this problem, and we are confident that we can do that.

Mr. WELDON. When we designed the program, they knew what they were going to have to deal with. We know that it was going to be NSA data coming in, and the contractors knew that, right? It is not some new development.

General LEWIS. Not new.

Mr. WELDON. We ought to hold them accountable. What do you think, Mr. Li? What is your comment, candidly, on this whole issue?

Mr. LI. The avionics problem did crop up earlier than last summer, and the issue, and I am trying to give you a balanced view of this. I think this is an extremely complex system that they are trying to build in terms, from software perspective. The integration of communications, navigations, electronic warfare, even vehicle health systems is extremely complex. We have never done that before.

That said, we are talking about a process right now where the system goes down when everything is playing together. I am trying to kind of talk about it in English. Everything works okay by itself, but when you turn everything together the system goes down. Now, the good thing is that the airplane can still fly. Their flight control system still works.

The problem is stability. They cannot get that software to work together for an extended amount of time. Some of the fixes that—

Mr. WELDON. So you have got a \$270 million Piper Cub up there because you have no integration of the data, which is what it is supposed to have.

Mr. LI. I think a Piper Cub is not quite as complex as the F/A-22.

Mr. WELDON. If you have don't have the software, what is it?

Mr. LI. I think that the Air Force should respond to that question.

Mr. WELDON. I am telling you, I am a little upset right here, right now. You know, the contractors, didn't they know, going in, what they were going to have to do?

Well, they ought to be paying for a large cost and eat this cost themselves, rather than throw \$876 million back on the taxpayers, when they knew in advance what they were being tasked to do. If they couldn't do it, they shouldn't have bid on it.

General LEWIS. The \$876 million, that is not all software. That was—

Mr. WELDON. How much of it is software?

General LEWIS. Probably about a \$100 million of that.

Mr. WELDON. Do you agree with that, Mr. Li?

Mr. LI. I thought it was a little bit more.

Mr. WELDON. How much more?

Mr. LI. I thought it was half.

Mr. WELDON. Well, that is a big difference between a \$100 million and \$400 million.

General LEWIS. No. The biggest part was the actual testing on the aircraft. But, sir, let me give you an idea, when—this aircraft can go out there and fly a full mission and not have an avionics reset; for the stability on the particular flight.

There are other times, though, when it fails five times in one flight. So it is erratic, but we take the average between those two flights, and that is where you get 1 hour. So they are getting a lot of training done, they are working at operational procedures.

What we found out was really that we had two problems, one was a lab problem, and one was the interpretation of the software development tools. We are fixing both of those now. We will get this rapidly fixed.



Mr. WELDON. My problem is that the contractors when they bid on this aircraft, knew the challenge that they were going to face, and they told us that they could do it. Now, as they come back and ask for more and more money, which under our cap decreases the amount of aircraft we can procure, they want more money out of the taxpayers. I think that they ought to start eating some of this money themselves.

We have had this same thing occur with other programs. We had it occur with the Theater High-Altitude Area Defense (THAAD) program. We finally had to tell the contractors, if you don't get the test program straightened out, we are going to fine you \$10 million out of every test you make that is unsuccessful. They got the program straightened out.

I mean, this is not—my point is, this is not just a cash cow where they can come back, and whatever they want, we are going to pay. We are going to raise the cap whenever they want it raised, and they just keep adding more money in. Those contractors are all, as companies, friends of mine, but this is disgusting.

General CORLEY. Mr. Chairman, if I can comment again with regard to this, sir. Collectively, within the United States Air Force, our government team on this, and with our contractor, we share this grave concern, even outrage over the current status of avionics. I will also tell you that our previous approach to avionics was dreadfully flawed, sir. We have changed that approach, as General Lewis has told you.

We brought in entirely new people. We have brought in individuals, both inside and outside of government, to further assess this program to find a better way, because you are right, Mr. Chairman, this has broad implications to not just this program, but to other programs that follow.

Further, sir, you are seeing, perhaps in a way, from some of your opening remarks, the unintended consequences of too few dollars within a program. If you begin to restrict the dollars, you begin to restrict your opportunities for investment in avionics interrogation labs. You begin to restrict the number of dollars you have in terms of other aircraft that fly and test.

Those items, all taken in concert, sir, suggest to us why it was critical for us to change, totally, leadership within this program, both with the military and on the contractor's side, as well as our approach to dealing with this. But, sir, I would still like to recall that this is the development phase of the program, and not unlike fin buffet, which we experienced, we were able to overcome that. I have confidence that we will overcome this avionics stability issue as well.

Mr. WELDON. Well, General, I understand your statement. But staff has just pointed out to me, you are saying that we starved the program or that cost was an issue. I said at the beginning that we don't have enough money for all of our tactical aviation needs, but I will use this figure from the GAO Report. Over the last 6 years, DOD has identified \$18 billion in estimated production cost growth, bringing the total estimate to \$42.2 billion, \$18 billion of increased production cost growth.

That is a heck of a lot of money over what the original estimate was, Mr. Abercrombie.



Mr. ABERCROMBIE. I want to make sure that I understand. You understand we are asking you questions, you are the ones on the hot seat. I don't expect you to have answers. You have come in, I want to say, at a late date to try and scramble to make this right, and I am sure I speak for the chairman when I say we recognize that. The reason we are asking the questions as we are, you heard me during the first panel, is we have got to make some real hard-nosed decisions in here about where we are going to put money to marry up technology and military platforms and the people in mission.

Because we are the only ones that can decide it, not the newspapers, not Mitch Daniels down at the White House or the rose garden or wherever the hell he spends his day. We have got to make that decision in here. I am still not clear about this NSA question, because I hadn't heard that before.

Are you saying that the NSA can tell you or tell the manufacturer what they can or cannot do with respect to collecting intelligence in realtime and then translating that, say into the tactical air operations that were mentioned in the previous testimony by the Navy and the Air Force, that kind of thing, the Navy and the Marines?

In other words, when you were integrating or coordinating the F-22 into actual operations, the NSA is telling you that you can't do some things in realtime and then translate that into mission accomplishments?

General LEWIS. They don't tell you that you can't do something. They just put restrictions on how you encrypt software and how you handle the software, the actual——

Mr. ABERCROMBIE. Okay. Then I will follow up on the Chairman. Surely something like that didn't come up in the last year or the last 6 months.

General LEWIS. We didn't realize—we knew last summer they were unable to find the root cause of some of these stability bugs that are in the software. And so we——

Mr. ABERCROMBIE. Aren't the stability bugs that you are referring to NSA admonitions to you, or am I misinterpreting what you are saying?

General LEWIS. No. You are misinterpreting it. It is just the way we develop the software. You usually put in ways to capture data so you can go to the root cause. When a malfunction occurs, you can trace it all the way back and say, okay, this line of code needs to be fixed.

They dropped out some of those software development tools because they thought they were unable to capture realtime data because of the security of the data itself. And so——

Mr. ABERCROMBIE. That was just discovered?

General LEWIS. In January, yes, sir. This has been a 2-year problem with it, and we didn't realize that until we sent this OSD special team under Dr. Sega, out to TRW, now Northrop Grumman in San Diego, who was one of the key labs in this.

Mr. ABERCROMBIE. You mean they were developing this the whole time and the Air Force was not aware that they were developing it under these restrictions from the NSA?

General LEWIS. That is correct, sir.

Mr. ABERCROMBIE. How the hell could that happen?

General LEWIS. I am not sure.

Mr. ABERCROMBIE. Have any heads rolled? Has anybody been brought into account for it?

General LEWIS. Yes, sir. The head avionics developer on the Lockheed Martin team has been—

Mr. ABERCROMBIE. I appreciate that. Thank you for your candidness on that. But, Mr. Chairman, I think we have to follow up a little bit on this.

General LEWIS. One other point, sir, is they are working this EMD, it is no fee. It is basically cost, we pay them cost and maybe an award fee, but that is it.

Mr. ABERCROMBIE. I think the committee should have been informed of that then, because that dramatically affects what is happening.

In any event, GAO says that the plans to complete the avionics testing can't be completed before the first quarter of 2005. Do you agree with that?

General LEWIS. They are saying the avionics testing?

Mr. ABERCROMBIE. They said the plans to complete avionics testing, which includes the question of software and all of the other elements involved with software stabilization and so on, that the expectation is, and I presume that the GAO is quoting the Air Force here, that the avionics schedule to accommodate avionics stability testing plans to be completed in the first quarter of 2005. Do you agree with that estimation?

General LEWIS. No, sir. All of the stability issues that we are talking about now, the 1 hour mean time between failure, we are going to get resolved now over the next few months.

Mr. ABERCROMBIE. I am not sure we are talking about the same thing. I am talking about the avionics. Let me—do you happen to have that report handy, the GAO report? I don't want to—

Mr. LI. The statement itself, General Lewis.

Mr. ABERCROMBIE. Okay. I will let it slide, but maybe for the record you can—Mr. Li, you know what I am talking about?

Mr. LI. Yes, sir. You are referring to the actual complete test of the avionics.

Mr. ABERCROMBIE. Of avionics. Which includes—

Mr. LI. What we were told—

Mr. ABERCROMBIE. Which includes the stability?

Mr. LI. That is correct, sir. It was the complete test that they have to perform on avionics. We were told that that would occur in the first quarter of 2005.

General LEWIS. There are some additional combat functions that will be added on later, but the stability portion, the fundamental essence of the software and capability of this airplane, will be done in the near months, not 2005.

Mr. ABERCROMBIE. Okay. What about the vertical fin buffeting? There is no time line in the GAO report with respect to that.

General LEWIS. Sir, that is fixed. We have actually gone out and tested the fix. It goes into the production aircraft. And we—it is very little money. It is only \$60,000.

Mr. ABERCROMBIE. When was that fixed? Did you inform the GAO? Because the date of GAO report here is April 2nd, today. That is the date of the report. And that doesn't reflect.

Mr. LI. Mr. Abercrombie, our point was that we recognized the flights, and that the fix had been done above 10,000 feet. Under 10,000 feet, which is that part of the envelope where I would anticipate a lot of dog-fighting to occur, we want that aircraft to be able to perform the best it can.

And they have not completed testing of that yet. They do not have that done yet.

Mr. ABERCROMBIE. I was going to get to that.

General CORLEY. Sir, can I clarify just a couple of moments? This aircraft, as I said in my opening statement, is about air dominance. It is not just about air superiority. In fact, the focal point of this aircraft, what it pivots around is its air-to-surface capability. You have to be able to deal with those anti-access threats, because no other way of being able to deal with them does exist now or into the future. It is not just about dog-fighting, number one.

Number two, as far as dog-fighting below 10,000 feet, within the Air Force concept of operations, that is not where we are going to fly this airplane.

Mr. ABERCROMBIE. What if you have to?

Admiral CORLEY. Yes, sir, exactly right. What if you have to? Number one, we folded into Lot 2, as far as the production on this aircraft, changes to the aircraft itself. We removed a composite spar in those vertical tails. We added strengthening and fasteners to a rudder hinge. So those have already been incorporated into, and we have examined those portions of the envelope most critical that could potentially impact structurally on the tail of the aircraft.

And as far as—

Mr. ABERCROMBIE. Excuse me, General, because of the limited time. I appreciate what you are saying. But what I was told, as a lay person, I am not an aviator, I am not an aeronautical engineer, but I am a legislator. What I was told, as a legislator, what I was voting on was a plane that could do everything that every other plane did plus.

Now, what you are telling me is you can do the plus but you are not sure that it can do what every other plane is supposed to do.

Admiral CORLEY. No, sir. If I have in any way misrepresented that, then I should not, sir. You are going to get an aircraft that is pluses across the board.

Mr. ABERCROMBIE. Is it ready now? Are you saying—is this fixed, this vertical fin buffeting.

General LEWIS. Sir, we have flown test flights below 10,000 feet. The engineers have projected those out and said that this fix will work below 10,000 feet. By August, we will have that 10,000 foot cleared for our modifications.

Mr. ABERCROMBIE. Well, Mr. Li, has the Air Force had access to your presentation to us?

Mr. LI. Yes, sir. This is on the basis of our two reports. And—

Mr. ABERCROMBIE. Okay. The reason I am asking the question, is that they should have been able to respond to your report and say, okay, we heard what you said, here is our response to that,



but we are getting it in the hearing. That is why we have hearings. This is good.

Let me move on. Overheating concerns. The GAO says to prevent the heat build-up during flight testing, the aircraft is restricted to flying just over 500 miles per hour. Is that correct?

General LEWIS. It was correct, sir. But, again, we have designed—first of all, this came up on our instrumentation on our test airplanes out at Edwards. We designed a fix and we have actually gone and put the fix into the airplane and tested it, it works. Now, those fixes are also going into production aircraft. And the total cost was less than \$3 million.

Mr. ABERCROMBIE. So that is not an issue? You don't fly at less than 500 knots now?

General LEWIS. No, sir. We no longer have restrictions with this modification.

Mr. ABERCROMBIE. All right. I wish we would have had a response to this beforehand, but that is okay. I will take your word for it. Okay. Well, let me just go to the end, because I am sure my time is up, and we will give you some questions for the record.

I want to make sure I understand the flying hours time, the impact of the maintenance needs. This is particularly true given the different kinds of atmospheres and terrains and so on that we might be dealing with, different climatological conditions that we may have to deal with worldwide.

Here is what the GAO says. The Air Force estimates the F/A-22 should at this point in its development be able to complete 1.67 flying hours between maintenance actions, and 1.9 flying hours by the end of the development. Is that a fair statement?

Is that a fair statement? Do you agree with that?

General LEWIS. Sir, at this stage, with 2,681 hour—flight test hours, we should be at 1.4. I do agree with the 1.95 at the end of EMD, and it is actually 3 hours at 100,000 hours.

Mr. ABERCROMBIE. Okay. Unfortunately, the aircraft now requires five times the maintenance actions expected at this point in the development. Are you telling me that that has been reduced?

General LEWIS. It has been reduced a little bit. It is now about four times. There are certain fixes out there we have identified; and once we get those in, then we will be back on track. We are below the learning curve right now, and we have fixes identified which we have not fielded yet.

Mr. ABERCROMBIE. Okay. My last point then, so, again, taking into account that I am not as familiar as you might be with the terminology and what it exactly relates to, if I understood you correctly you say you can fly an hour now?

General LEWIS. No.

Mr. ABERCROMBIE. With respect to the question of software and—

General LEWIS. No. What they are saying is that an airplane will fly in the meantime between maintenance required. That could be in addition to software. It could be low absorbable restoration, tires, light bulbs, all those things.

Mr. ABERCROMBIE. Yes, sir, I understand that.



General LEWIS. Yes, sir. But the avionics, obviously, severely limits that right now today. As the avionics get better, this number will improve dramatically.

Mr. ABERCROMBIE. So is it fair to say then, because of that, that the GAO says as of November of last year, approximately five months ago—when you came on board, right, if I remember correctly.

General LEWIS. Yes, sir.

Mr. ABERCROMBIE. Approximately when you came on board the developmental test aircraft had been completing about .29 flying hours between maintenance actions. Was that true about 5 months ago?

General LEWIS. Yes, sir.

Mr. ABERCROMBIE. And you say that has improved then over the last 5 months.

General LEWIS. Yes, sir.

Mr. ABERCROMBIE. Okay. Thank you very much, Mr. Chairman.

Mr. WELDON. Thank you, Mr. Abercrombie.

Dr. Gingrey.

Dr. GINGREY. Thank you, Mr. Chairman.

General Corley, General Lewis, this aircraft, the F/A-22—and even Mr. Li in his testimony says, and I will read from the first line of his conclusion, the F/A-22 has the potential for being the most advanced air superiority aircraft ever to join the Air Force inventory—using several advanced technologies and capabilities.

General, you talked earlier about the current F-15 and the fact that, at this point in time, that we have air superiority over our adversaries, not so much because we have the best tactical fighter in the sky today but because we have the best trained pilots and that gives us superiority, but equipmentwise we don't—there are countries, China possibly, and others, that have tactical fighters that could outperform the current inventory, the F-15 in particular—and how important it is to maintain going forward with that air superiority and we can only do it with the F/A-22.

You don't have to convince me at all of that. And it is—I am sure nobody on this committee is more concerned about this program going forward. Yet there are some real, serious concerns expressed—and certainly my chairman has brought those out very strongly at this hearing—concerning the avionics; and I just want to maybe hear from you once again a little bit of reassurance that—and I know you have been trying to do that over the last hour and a half. But I want to hear you make some very positive statements about the need for this aircraft to maintain that air superiority and that you are satisfied that we have made the changes, both from the manufacturer and from the Air Force—obviously, General Lewis is a big part of that—that we are going to solve this avionics problem and we are on track to do that.

General CORLEY. Thank you for the opportunity, sir. I would like to respond very positively to both aspects of your question.

First, in terms of the need—very critical need for this aircraft, it goes without question unless we want to cede the lead in fighter aviation, unless we want to cede anti-access areas around the world to someone else, we must have the F/A-22 and the critical capabilities that it delivered.

The second point, sir, is also a very fair assessment, and the chairman has appropriately pointed out lessons from the past that we must learn on this program. We have made a dramatic change in our approach to this program, not just in our approach to trying to resolve the avionic stability issue but our approach to dealing with the fin buffet issue as we have moved ourselves through development. I am very confident in the new leadership team both within the Air Force as well as within the contractor, that they will push aside these issues.

We have passed our first fatigue life. We have resolved our fin buffet issue. We are showing some opportunity to demonstrate to you and successfully come back to you and inform you on our success with avionics. Because this Nation has to have the F/A-22, sir.

Dr. GINGREY. Thank you, General.

The CHAIRMAN. I thank the gentleman.

Mr. Wilson from South Carolina is recognized for five minutes.

Mr. WILSON. Thank you, Mr. Chairman; and, really, it is a restatement of what Congressman Gingrey was asking, in a way in that, as I hear people expressing concern about a new age of fighters like the F/A-22, the questions that come from the public really relate that the future threats as exhibited by Iraq, which was not even able to provide any ability to even depart from their air bases, why would we need to have something better than what is already obviously the best currently?

General CORLEY. Sir, that is an excellent point; and one that I would propose the following answer to you. It is why I also began with a discussion on these advanced surface-to-air missiles that are out there today in some of the countries that were mentioned here in previous testimony by members of the committee. These advanced surface-to-air missile systems have the potential to render our legacy aircraft force impotent to be able to do anything in the future. That is a very dangerous precedent for us to be able to follow.

I would very much love the fact that an F-15, which I have more than two decades worth of experience with, could continue to be viable as far as being able to project power into those threat areas or to be able to deal at the supercruise speed capabilities with potential cruise missile threats against the United States. But, regrettably, our legacy fighter force cannot do that. That is one very important thing for me to say. We are not projecting into the future.

We are also saying that this is an admission that these threats exist today, and they are proliferating, and for an adversary country it would be a reasonably wise investment for them to do because they could push aside our magnificent air power from our Marines, our Navy and our Air Force that we have been able to use so effectively in the conflicts in the past. That is, in my opinion, why it is critical also for us to have the F/A-22, sir.

Mr. WILSON. I appreciate that very much. Because as we are observing daily what is going on, air power is again proving itself and to enable our ground combatants to proceed forward.

I appreciate your answer very much, and I yield the balance of my time.

Mr. WELDON. I thank the gentleman.

General, there was a test aircraft nose wheel strut that reportedly recently collapsed. Can you describe what happened and tell us if that was an isolated incident or what?

General LEWIS. Sir, that was an aircraft out of Edwards. It happened last week a week ago. It came back from flying and was shutting down one engine and then the other; and, as the second engine was shutting down the hydraulic system, the hydraulic was taken off and the nose gear retracted. We grounded the F-22 for 3 days until we had a work-around fix.

There is an accident investigation going on right now. It was an unsolicited retraction, you know, somehow in the system. But we have a work on right now. There are other fighters out there today. We pin the nose gear before we shut down just for that reason. We are doing that now with the other aircraft, and we don't have the results yet from the accident investigation.

Mr. WELDON. How much damage was done to the aircraft?

General LEWIS. It was minimal. Just a little bit on it. The doors were open, and therefore it hit on the doors and just scraped a little bit down there. So it was just minimal.

Mr. WELDON. Mr. Abercrombie.

Mr. ABERCROMBIE. General Keys, I recognize and admire your zeal in defending the program that you are now associated with. Surely you didn't mean to say, just for the record, that China and Russia are currently spending this kind of money in developing a fighter airplane. You said we were going to cede to them. I have no information, I mean, that would outstrip the budgets that they have, let alone for the development of an airplane like—they are not spending \$42 billion on a fighter plane.

General CORLEY. Sir, I hopefully did not explicitly mention any specific country, especially not those that you mentioned here. What I talk about as far as ceding is this ceding of access into an area and also talking about the investment that countries could make this the type of double-digit surface-to-air missiles that could deny the F/A-18.

Mr. ABERCROMBIE. That is a separate issue.

General CORLEY. Absolutely.

Mr. ABERCROMBIE. What we are talking about here then is stealth capabilities, is that correct?

General CORLEY. Sir, I think it is the combination of attributes that make this aircraft so unique. It is the unprecedented maneuverability.

Mr. ABERCROMBIE. Let's concentrate on the missile for the moment. Are you saying the maneuverability of this plane is so superior that it can avoid the missiles that you are talking about?

General CORLEY. Clearly, sir, it is taken in concert. All of these unique aspects of this aircraft, bring them together. Because you see, as I listen to your question, I think you are framing this right. There are other countries that do possess current and advanced fighter aircraft that have or possess some attribute or some aspect of what an F/A-22 does, or they have achieved parity with our legacy aircraft. Maneuverability might be one aspect.

Mr. ABERCROMBIE. At least in terms of their proposed design.

General CORLEY. Or with regards to what they have already demonstrated today, sir.



I know you have heard our leadership from the Air Force talk in the past in testimony that our pilots flying their aircraft beat our aircraft every day. That is our legacy aircraft that is out there. And the reason that is, sir, is because they have achieved and reached parity in items like maneuverability with us.

With F/A-22, we, again, take that leap ahead, if you will. We are able to outdistance them in terms of maneuverability. We are able to leverage our stealth attributes. Whether it is an advanced fighter or whether it is a surface-to-air missile that is potentially fired against us, we can maneuver to survive and then we are lethal enough to go back and destroy that and leverage another force to come in, sir.

Mr. ABERCROMBIE. All right. Are you presuming that surface-to-air missiles won't improve?

General CORLEY. No, sir. In fact, we are planning that they will. That is, once more, why we have that combination of attributes. That is why we are examining not just today's missile.

Mr. ABERCROMBIE. You don't think current aircraft can be modified, as we have been modified in one instance after another, some of which you enumerated today, to be able to deal with surface-to-air missiles as you anticipate them being?

General CORLEY. Not to the degree that these threats potentially pose, sir.

Mr. ABERCROMBIE. Well, then let me ask you one final question. Are we trying to make the F/A-22 too fancy then?

General CORLEY. No, sir.

Mr. ABERCROMBIE. And I am not trying to be sarcastic when I say that. I meant that you are overproducing it and overdesigning.

If the principle thing is surface-to-air missiles that you see as the prime capacity of countries who aren't going to be building any aircraft of this capability, who are looking for ways to—let me start over again. If it was me and I was in some other country taking on the United States, I would use your technology against you. I would try to find simple things that I could afford to do that could mess you up—throw sand in the gears. You know, I don't care. There's not an engine yet that doesn't have sand in the engine that wouldn't bring it to a halt.

General CORLEY. I think you have got that exactly right, sir. I think that is, in fact, what we are seeing potentially play out around the world. Using technology, where someone recognizes that they potentially cannot develop an aircraft with all of the attributes of the F/A-22, so they might turn to a surface-to-air system to try to deal with legacy aircraft, deny us. That is why we need this aircraft, sir.

Mr. ABERCROMBIE. Well, I will take your word on that for right now. But still, you get my point. You can overdesign something. The time and when we can actually get it into somebody's hands is getting further and further away.

General CORLEY. Yes, sir. We still see ourselves for this initial operation capability in 2005.

If I can, sir, our thought process as far as the design goes this way. As opposed to just sitting and talking about what we would like to have on the aircraft, instead we have said, what do we need to have on the airplane to meet within the concept of operations



to insure that we can deal with anti-access threats, with advanced fighter threats that are around the world today? What are the enduring attributes, the one—the most important of which is the supercruise capability? That supercruise maneuverability, stealth, those are the attributes that allow us to be able to survive and then also be lethal, sir.

Mr. ABERCROMBIE. Okay. Thank you.

General LEWIS. Just on that advanced SAM, just one other thing. You talked about legacy platforms. The problem with the advanced SAMs is they can shoot down cruise missiles. They can shoot down any of our aircraft and any cruise missile that goes after the advance SAM. What the F/A-22 can do at supercruise with that speed and stealth is get close enough to deliver a supersonic weapon which it has never been able to shoot down. It is the key enabler in the future.

Mr. ABERCROMBIE. Is that prepared today?

General LEWIS. Sir?

Mr. ABERCROMBIE. Is that capable today?

General LEWIS. That is what we are designing in it for IOC.

Mr. ABERCROMBIE. Okay. All right. Thanks, Mr. Chairman.

Mr. WELDON. I thank my colleague.

Gentlemen, we thank you for being here; and we did not mean to be offensive to you personally. But we have to make some tough decisions. We have our colleagues that want us to kill one of the attack programs because of the cost problems that we have. We don't want to do that. I mean, I think you would find that almost everyone here agrees that we want the best air superiority and air dominance that we can give our services. But we don't want to give the contractors a free holiday.

All of us are friendly with the contractors. But I am going to tell you right now, and I will say it publicly, my primary word goes out to the prime contractors. They had better get their act together. This is not what they said they would deliver within the cost they said they could provide to do the job they said they could do. This is no longer the cash cow where they come back in and say, give us another couple of \$100 million and we will solve your problem for you. This is as much their problem as it is our problem.

So, for any media here, you can quote me. We are going to be watching the contractors very aggressively. They are going to be coming, and they already are, asking for more bucks in the annual mark-up process, already begging for the money. All of them, including the primes here.

What I am going to say now is, Mr. Li, how much money do you need as an add-on? Because I want to give you more assets to watch the hide of these people that are asking us for all the pluses. How much do you need to do the job you are doing?

Mr. LI. Sir, since we are on the hook for an annual review of the EMD program, we will be vigilant in doing that.

Mr. WELDON. But how much more do you need? They are asking for hundreds of millions. How much do you need for more assets?

Mr. LI. I am not asking for any more money.

Mr. WELDON. We want you to come back to us.

Mr. LI. We will.

Mr. WELDON. Even though you don't come under directly our committee, we will make the case to the Government Reform Committee, who I think has jurisdiction over GAO. I will talk to Chairman Tom Davis. We will give you what you need in the way of new assets. Because now, more than ever, we need the oversight and the critical questions that you are asking to be there so that we can, in fact, monitor the cost growth of this program.

In the end, we hopefully will have a program that all of us can support that will accomplish the objectives of the distinguished leaders here from the services who I know their hearts are in the right place. I know they are working their tails off to give us the product we want. We all know that and don't question it.

But I will tell you the anger I am showing today is aimed at the contractor base.

This hearing stands adjourned. I thank you all for coming in.

[Whereupon, at 5:15 p.m., the subcommittee was adjourned.]



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# **A P P E N D I X**

APRIL 2, 2003

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**PREPARED STATEMENTS SUBMITTED FOR THE RECORD**

APRIL 2, 2003

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Statement of the Honorable Curt Weldon  
Chairman, Subcommittee on Tactical Air and Land Forces

Navy & Air Force Programs

April 2, 2003

The Subcommittee will come to order.

This afternoon we will receive testimony from Departments of the Navy and Air Force witnesses, on the President's fiscal year 2004 budget request for tactical programs.

Before we proceed, I want to again commend our men and women serving in all of our military services, coalition personnel, and those supporting them, for their dedication and professionalism in the on-going war on terrorism and elimination of weapons of mass destruction. We wish all of our personnel, "God speed."

In following the war in Iraq, one has to be impressed with how well our people are performing and how well the equipment that has been provided to them is performing, under the most stressing of environments. Yet in some instances we can and must



do better. Specifically in the area of friendly fire, with the complexity of the operation, accidents are to be expected, but we certainly should never accept them. Unfortunately, we pay a great deal of attention to the friendly fire issue during wars, but insufficient attention to them between wars.

While we have intense interest in how events are unfolding on the battlefield, our objective must be to provide the weapon systems of the future, that will deter potential enemies and failing that, will decisively win tomorrow's battles. We must seek to provide the proper resources to achieve the right balance of affordable force structure and capabilities to meet the new challenges, that surely lay ahead.

As has been demonstrated too often, acquiring affordable systems is a difficult challenge. The list of issues that result in broken programs is well known. To reiterate a few:

A failed requirements process;

Inadequate funding;

Moving forward with incomplete designs and immature technologies;

Failed leadership and bad management; and

Lack of competition.

I am confident the leadership in OSD and in the military services is trying to avoid the missteps of the past that have yielded failed programs. Yet in reviewing the budget request before us, many of the reasons for past failures are evident in proposed programs. To mention a few:

The F-35, JSF program has cut development funding for the competing engine program;

Funds are being requested for new electronic combat programs without an agreed-to electronic combat architecture or development plan;

The UCAV program lacks an agreed-to requirement, with the current budget request being different than the recently published UAV roadmap; and

The F-22 request proposes increasing production with outstanding development problems.

To address these and other important issues today, we will have two panels: The first will address Navy and Air Force acquisition issues and the second will focus on the status of the F/A-22 program.

The F-22 has been in development for nearly 12 years with the low rate production decision having been made in 2001.

While intended to provide a number of impressive combat capabilities, the program continues to face difficult development and production issues.

In 1992 the approved program, in constant 2003 dollars, was programmed to deliver 648 aircraft at a program unit cost of \$115 million per aircraft. Now, 11 years later, the programmed buy is projected to be 276 aircraft, at a program unit cost exceeding \$250 million per aircraft. This constitutes a nearly 60 percent decrease in the number of aircraft and well over a 100 percent increase in price. The development cost recently was reported to have

increased another \$876 million. This has impacted the fiscal year 2003 planned procurement, reducing it by 3 aircraft, from 23 to 20.

In addition to cost problems, development problems persist.

The avionics software continues to be unstable and excessive vertical stabilizer vibrations are experienced in certain flight regimes, that if uncorrected would reduce aircraft service life.

The Air Force continues to state that it has planned production investments that will result in efficiencies that will result in reduced costs and ultimately to the procurement of more aircraft. Yet the Air Force reportedly has underfunded the required investments required to achieve the promised production efficiencies.



NOT FOR PUBLICATION UNTIL RELEASED BY THE  
HOUSE ARMED SERVICES COMMITTEE  
TACTICAL AIR & LAND FORCES SUBCOMMITTEE

STATEMENT OF

THE HONORABLE JOHN J. YOUNG, JR.  
ASSISTANT SECRETARY OF THE NAVY  
(RESEARCH, DEVELOPMENT, AND ACQUISITION)

AND

LTGEN MICHAEL A. HOUGH  
DEPUTY COMMANDANT FOR AVIATION

AND

RADM MARK P. FITZGERALD  
DEPUTY DIRECTOR, AIR WARFARE DIVISION

BEFORE THE

TACTICAL AIR & LAND FORCES SUBCOMMITTEE

OF THE

HOUSE ARMED SERVICES COMMITTEE

ON

FY 2004 NAVY AND MARINE CORPS TACTICAL AVIATION PROGRAMS

APRIL 2, 2003

NOT FOR PUBLICATION UNTIL RELEASED BY THE  
HOUSE ARMED SERVICES COMMITTEE  
TACTICAL AIR & LAND FORCES SUBCOMMITTEE

Mr. Chairman, distinguished members of the Subcommittee, thank you for this opportunity to appear before you to discuss the Department of the Navy's fiscal year (FY) 2004 Budget request for Tactical Aviation. LtGen Hough, RADM Fitzgerald and I are proud to come before you today and outline our most recent efforts to enable the Department of the Navy to field the most capable and lethal tactical air force in the world.

I recently visited our Sailors and Marines in the Persian Gulf area, including Kuwait and Bahrain, and we can rest assured that our Sailors and Marines guard our freedom with a dedication born from a voluntary commitment to defend the ideals of our founding fathers. It is my pleasure to outline the contribution that we in the Navy and Marine Corps acquisition community are making to enable the Department of the Navy to field the most capable, mobile and lethal force since its inception over 225 years ago.

The Global War on Terrorism has fundamentally changed the national debate on defense. To meet this challenge, difficult decisions were required to find the optimal mix within the portfolio of Naval responsibilities, and within that, tactical aviation requirements of the Department. We have been good stewards for the taxpayer by demonstrating creative thinking such as utilizing the inherent growth capabilities of the F/A-18E/F to meet the airborne electronic attack requirement; making sound fiscal decisions including integrating Navy and Marine Corps tactical aviation assets to achieve significant reductions in procurement and operating support costs; reviewing the need for some of our legacy systems; and leveraging these actions to increase the number of aircraft being requested in the FY 2004 budget. By addressing key issues such as the cultivation of promising aircraft technologies, cost effective acquisition of mature systems, and improved maintenance of existing systems, we have been able to increase the number of aircraft from 89 in last year's budget request to 100 in the FY 2004 Budget request.

In striving to provide the warfighter with the latest capabilities, we have adopted the tenets of Naval Vision 21 and Naval Transformation Roadmap 21. In doing this, we have engaged in a full assessment of Naval Science and Technology funding to ensure we have addressed all technology needs to support these transformation mandates. To this end, technology demonstrations are planned using Future Years Defense Program (FYDP) funds that aim to meet the needs of our forces -- stretching from the ocean floor to the edge of space, and from facilities in the United States to the tip of the spear throughout the world.

Our actions to get the best value reach beyond the Department of the Navy. For example, the Department has worked in partnership with the Air Force on the Joint Strike Fighter (JSF) program to deliver an affordable and supportable strike fighter. Recently, we have also developed a joint strategy with the Air Force to develop an unmanned combat air vehicle (UCAV). UCAV will be a critical part of our future tactical aviation force structure.

## ENHANCING WARFIGHTING CAPABILITIES

The Navy and Marine Corps Team is the greatest maritime force in the world, but it is imperative that we transform our tactical aviation warfighting capabilities to meet the emerging challenges of the 21<sup>st</sup> Century. We are changing and initiating programs to improve the warfighting capability of current and future forces. Furthermore, we are seeking joint opportunities and options wherever possible in taking these steps.

Our plan capitalizes on ideas that facilitate our recapitalization goals. An excellent example is the JSF, a stealthy, multi-role fighter aircraft designed to be an enabler for Naval Power 21. JSF replaces the Navy's F-18A/C variants and the Marine Corps' AV-8B Harrier and F/A-18A/C/D aircraft while complementing the Navy's F/A-18E/F Super Hornet. JSF offers dramatic improvements in affordability and supportability. The JSF program has partnered with Lockheed Martin, Pratt and Whitney and General Electric to make affordability the cornerstone of the program by reducing development, production and total ownership costs. Furthermore, we have imposed a discipline on ourselves that limits change during the critical phases of our major aviation procurement programs. This disciplined approach has been implemented in the JSF program through a Configuration Steering Board. By controlling the scope and timing of change in a planned manner, we know what changes will cost, and how we will pursue them in the most economical manner. Through these transformational business initiatives, the Department will emerge with an optimal force structure, a healthy industrial base and an efficient and appropriately sized infrastructure.

A critical enabler of transformational intelligence, surveillance and reconnaissance, the E-2C Advanced Hawkeye Program will provide a robust overland capability against current and future cruise missile-type targets.

The KC-130J Hercules will also be a critical enabler of the Department and the Joint Warfighter. The KC-130J's increased range, payload, and survivability will provide an enhanced aerial refueling capability and subsequently greater strategic agility, operational reach and tactical flexibility.

As the Global War on Terrorism has demonstrated, unmanned technology will play an ever-increasing role on the 21<sup>st</sup> Century battlefield. The Department is committed to fielding an array of Unmanned Aerial Vehicle (UAV) programs, including tactical UAVs, Maritime Surveillance UAVs and an UCAV initiative, developed in partnership with the Air Force. The Navy and the Air Force have been able to define a common set of science and technology requirements while also recognizing the unique needs of each Service. This work will support a competitive acquisition strategy for UCAV. UCAV is a critical tool for providing persistent surveillance and combat capability for sea based Navy platforms.

## CHANGING OUR BUSINESS PRACTICES

The Department of the Navy remains committed to simplifying the acquisition system, streamlining the bureaucratic decision making process, and promoting innovation. We are streamlining our regulations and instructions to remove unnecessary impediments and provide the maximum flexibility to our acquisition workforce consistent with law and higher regulation. We are also continuing to take advantage of numerous acquisition initiatives to shorten cycle times, leverage commercial products and capabilities, and improve the quality of equipment being provided to our warfighters.

In an environment where competition is limited, the structure of contracts is critical to providing tools for the program manager to use in delivering aircraft and weapons on schedule and within budget. The Department is applying new contract strategies in an effort to focus greater attention on cost and schedule. We are implementing broken or stepped profit share lines to ensure that the Navy and industry are very focused on the cost target and that industry is rewarded for beating the target and penalized for exceeding the cost target. Further, we are shifting greater portions of fee to be awarded on an incentive basis upon accomplishment of critical path tasks. Finally, we are weighting fee towards the critical events at the end of a program that result in the desired goal – delivery of aircraft and weapons.

Evolutionary acquisition techniques show promise in programs such as the F/A-18E/F Program. Recognizing the requirement to replace our aging low density/high demand EA-6B aircraft with a platform that best accommodates the airborne electronic attack mission, the Navy identified the Super Hornet as the most viable candidate with which to leverage existing capabilities inherent in Naval Aviation in order to streamline the acquisition process and field a product sooner to the Fleet. We leverage industry involvement in our acquisition programs to reduce our research and development costs and gain economies in production. The Department is also actively improving its internal business practices, including integrating commercial best practices where feasible. By improving these practices, we expect to be able to shift more dollars into combat capability and quality of service.

We believe that better information makes for better decision making, both on the battlefield and at the budget table. We have four pilot programs in place utilizing enterprise resource planning, or ERP, which aim to improve the quality of information available to our decision makers. These pilot projects will eliminate dozens of incompatible computer databases and the business processes that once supported those databases. ERP should produce financial and managerial information that is more complete, accurate and timely. ERP will allow greater efficiency in our ship maintenance processes that should in turn deliver more ship availability for training or deployment. Our recent focus has been on converging the pilot programs to achieve even greater synergy of management information across a broader spectrum of the Department, and working with the DoD Comptroller to ensure these efforts are advancing the uniform business management architecture under development.



In addition to better information, we need flexible and innovative tools to help manage the Department. Some of these tools, such as strategic sourcing, are being used already. Furthermore, competition helps achieve the best quality support to the Sailor and Marine at the lowest possible cost by introducing the discipline of the marketplace. Another approach we are taking to improve logistics support to the warfighter and reduce total life cycle system costs is through Performance Based Logistics (PBL). This year, all ACAT I & II fielded programs and all new programs submitted PBL implementation plans with milestones. PBL has been successfully implemented on numerous weapon system components (improving capability and lowering costs) and the intention is to expand these successes to major weapon systems and subsystems. We are also continuing to pursue Depot Maintenance Partnerships between the private and public sector. These partnerships provide increased capability to our depots while simultaneously reducing cost and improving warfighter capability.

The Department of Navy has experienced success with the Lead Systems Integrator (LSI) concept. An example of the LSI concept is the F/A-18 and Boeing. As the LSI, Boeing brings with it visibility, knowledge and responsibility at the weapon systems level, which is much broader than that of its subcontractors. Even though there may be additional "upfront cost" in the form of pass-through costs associated with this approach, the benefits of efficiencies and effectiveness over the full life of the weapon system, makes the LSI approach a very attractive tool.

We are working hard to ensure that our Sailors and Marines get needed technology in their hands today, not tomorrow. In areas ranging from Forward Looking Infrared upgrades for Marine Corps tanks, to ISR tools, to active anti-air warfare missiles, we are seeking greater jointness and taking advantage of prior DoD investments in order to reduce risk, lower cost, accelerate delivery, and provide greater interoperability.

### **FOCUSING ON OUR PEOPLE AND ORGANIZATION**

To enable development of new capabilities and facilitate the adoption of new business practices, a number of organizational changes have been made. I reorganized my business process owners by combining the Director of Acquisition and Business Management with the Acquisition Reform Office into a single Deputy for Acquisition Management. This new office focuses on business policy and implementation and infuses it with the innovative thinking and ideas of the office dedicated to reforming the way we do business. One of the primary goals of this reorganization is to shorten the time it takes new ideas to find their way into our acquisition business practices. The Deputy for Acquisition Management is directly supporting the DoD effort to streamline the OSD policy and processes for major weapon systems embodied in the new DoD 5000 series directives.

In order to improve logistics support to the warfighter, I established a Deputy for Logistics. The Logistics office will coordinate efforts to insert logistics considerations early in the acquisition process where over 60% of the total life cycle costs are

determined. Equally important, logistical support of our current systems is a costly and complex part of today's acquisition management task. Finally, the Deputy for Logistics will play an important role in guiding the implementation of ERP across the Department.

In today's environment, many technologies and systems cut across program, platform and Systems Command boundaries. To leverage the expertise within our Systems Commands and ensure consideration and coordination of concepts that cross program boundaries, we created a virtual Systems Command. Each of the commanders will now work together to avoid duplication of capability and ensure that we achieve integration and interoperability benefits wherever possible within the Navy and Marine Corps.

Equally important, we are reshaping the acquisition workforce to concentrate on mission critical functions. These human resource plans call for an analysis of key characteristics of the acquisition workforce, an assessment and projection of changes in the workforce into 2008, and the identification of human resource process shortfalls that inhibit the ability to effectively manage this workforce. With the advent of civilian personnel "demonstration" programs with pay banding and the increase in outsourcing of commercial functions, we are seeing an emerging workforce that will be compensated based on their level of responsibility and contribution. Through enhancements to our career development program, which include continuous learning activities that augment minimum education, training, and experience requirements, we are developing our acquisition professionals to be better managers and leaders.

### NEW OPERATIONAL CONCEPTS

Beyond incorporating new capabilities that technology advances allow, we examined methods for achieving greater utility out of our existing assets. The result of this effort is the Department's initiative to integrate Navy and Marine Corps tactical aviation capabilities. This integration represents one of the most sweeping changes in years. A comprehensive study of overhead requirements was performed as an integral part of a Tactical Aircraft or TacAir Integration initiative that led to significant reductions in overhead. Substantive efficiencies will be realized through increased reliability and maintainability, commitment to properly fund readiness, spares, depot maintenance and modernization, improved simulation training, and a lower historical attrition than were programmed in the FY 2003 program of record. Navy and Marine Corps TacAir Integration will maximize forward deployed combat power and optimize the core capability of Naval aviation forces. Its positive impact will be felt across the Department's entire tactical aviation enterprise, from leaner, more capable fighting formations to streamlined procurement requirements (tactical and training) and manpower savings.

This initiative will integrate one Marine Corps strike fighter squadron into each Navy carrier air wing and three Navy strike fighter squadrons into the Marine Corps Unit Deployment Program (UDP) rotation. These actions will allow three active Navy

squadrons to be disestablished and two reserve squadrons (one Navy and one Marine Corps) to be disestablished. Our plan will reduce procurement objectives for F/A-18E/F from 548 to 460 aircraft and the JSF from 1089 to 680 aircraft. In total, this innovative program promises to save \$975 million over the FY 2004 – FY 2009 program, and provide approximately \$19 billion in cost avoidance from FY 2007 - FY 2012. Through increased modernization and readiness an integrated Navy – Marine Corps aviation force will provide increased flexibility of employment and surge capability to Combatant Commanders that the Department cannot approach today.

### **TACTICAL AVIATION ACQUISITION PROGRAMS**

The Department's FY 2004 budget will utilize Multi Year Procurement (MYP) arrangements for the F/A-18E/F (both airframe and engine), and the E-2C to maximize the return on our tactical aviation investment. Our proposed plan will procure 44 tactical, fixed wing aircraft (42 F/A-18E/F, and two E-2C), continue the development of the F-35 and E-2C Advanced Hawkeye and initiate an Airborne Electronic Attack (AEA) aircraft follow-on effort with the EA-18G.

#### **F/A-18 A/C/D**

The FY 2004 Budget request contains \$27 million for the upgrade of our F/A-18 As. The Marine Corps has initiated the upgrade of 46 F/A-18As (with a program objective of 76) to Lot XVII F/A-18C aircraft capability as well as digital communications and tactical data link. The Marine Corps anticipates programmed upgrades to enhance the current capabilities of the F/A-18C/D with digital communications, tactical data link, and tactical reconnaissance systems. This upgrade ensures that our F/A-18s remain viable and relevant in support of TacAir Integration and Expeditionary Maneuver Warfare until replaced by the STOVL JSF. The Marine Corps expects the F/A-18A to remain in the active inventory until 2015 and is exploring the feasibility of placing Litening targeting pod on our F/A-18D aircraft. This new capability can provide real time video to the ground commander via the Pioneer UAV Transmitter and Man-Portable Receiving Station.

#### **F/A-18 E/F**

The FY 2004 President's Budget requests \$3.03 billion for 42 F/A-18 E/F aircraft for the fifth year of a five-year MYP contract (FY 2000 – FY 2004). The Super Hornet has used a spiral development approach to incorporate new technologies, such as the Joint Helmet Mounted Cueing System, Advance Tactical Forward Looking Infrared System, Shared Reconnaissance Pod System, and Multifunctional Information Distribution System data link. The Super Hornet provides a 40% increase in combat radius; a 50% increase in endurance and 25% increase in weapons payload over our older Hornets. Three Super Hornet squadrons are already deployed in support of current operations. The F/A-18E/F is a significant step forward in improving the survivability and strike capability of the carrier air wing.

## **F-35 Joint Strike Fighter (JSF)**

The FY 2004 Budget request contains \$2.2 billion for continuation of Systems Development and Demonstration on the JSF. The JSF will enhance our Navy precision with unprecedented stealth and range. The JSF program commenced SDD in October 2001 and is on track to deliver operational STOVL variants to the Marine Corps in 2008 and the Navy variant in 2010. The STOVL JSF combines the multi-role versatility of the F/A-18 and the basing flexibility of the AV-8B, resulting in a stealthy, lethal, state-of-the-art aircraft. The commonality designed into the JSF program, along with advantageous procurement quantities will reduce acquisition and operating costs of Navy and Marine Corps tactical aircraft and allow enhanced interoperability with our Allies and sister Services. To maintain affordability, the Department will manage requirement growth using a senior oversight group as well as other methods.

## **AV-8B**

The AV-8B that we fly today is not the same aircraft that we flew 10 years ago. Over the last decade, the Harrier has gone from a day VFR air-ground attack aircraft to a night-adverse weather precision strike platform. The AV-8B remanufacture program has updated the Harrier into a more capable and more reliable aircraft. The wing and many original items are retained, but a new fuselage, a night-attack avionics suite (NAVFLIR, digital moving map, color displays, NVG lighting), APG-65 multi-mode radar, and the more powerful and reliable Pegasus (408) engine have been added. In addition to the AV-8B being one of the newest airframes in the fleet (average fleet age is approximately 8 years old), the remanufacture program provides an additional 6,000 hours of airframe life for 80 percent of the cost of a new aircraft. The remanufacture of 74 aircraft is programmed through FY 2003 with the last delivery scheduled for September 2003. Our AV-8B Harriers at Bagram Airbase, Afghanistan, have flown over 500 sorties and over 1500 flight hours supporting Special Operations Forces for OEF and have demonstrated the expeditionary flexibility of Short Take-Off/Vertical Landing (STOVL) aircraft while becoming the most forward deployed tactical aircraft in theater. From their austere base located over 5000 feet above sea level, the Harriers provide close air support, armed escort of aircraft and vehicle convoys, and air cover during helicopter insertions and extractions. Approximately 90% of our Marine Harrier gun squadrons are currently deployed and either in action or on watch around the world. The Harriers are equipped with the Litening targeting pod, a targeting system with real-time video capability that gives the pilots the ability to laser designate targets for precision munitions and mark spots on the ground with infrared energy. The precision capability to spot targets and self-designate for precision weapons has put the Harriers in Afghanistan in high demand--joint and coalition forces regularly request the Litening targeting pod capability in order to accurately locate and identify enemy positions. The enhanced AV-8B will continue to be a relevant platform until TacAir Integration and the transformational JSF are fully implemented.



## **KC-130J**

The KC-130J Hercules will provide the Marine Air Ground Task Force (MAGTF) and Joint Task Force Commander with a technologically advanced weapons platform featuring a state-of-the-art flight station. Enhancements in survivability and night vision capabilities will provide MAGTF Commanders with a superior force multiplier to project combat power. Operationally, the KC-130J will support an increase of 5000 feet in refueling altitude while increasing fixed wing refueling speed by 30 knots. Rapid Ground Refueling enhancements include refueling pod improvements that enable a 300-gallon per minute off-load to air assets and tactical vehicles. Aircraft speed and range will increase 21% and 35% respectively, significantly extending the MAGTF Commander's capabilities. The KC-130J will replace all active duty KC-130F/Rs. The Marine Corps, along with the Air Force, has recently signed a MYP contract. The Marine Corps has taken delivery of nine KC-130Js and will have procured a total of 38 KC-130Js at the end of the FYDP.

## **E-2C**

The FY 2004 President's Budget requests \$228.5 million to procure one E-2C and one TE-2C as the first year of a four-year MYP. This effort will keep the production line viable while the E-2 Advanced Hawkeye (AHE), formerly known as the Radar Modernization Program, continues spiral development toward an Initial Operational Capability in FY 2011. The Advanced Hawkeye program will modernize the E-2 weapons system by replacing the current radar and other system components to maintain open ocean capability while adding transformational surveillance and theater air and missile defense capabilities. The AHE program is scheduled to enter the SDD phase in FY 2003. Further, CEC is being integrated into our E-2C aircraft and FOT&E of this added capability is ongoing.

## **EA-18G**

The Navy is initiating Airborne Electronic Attack (AEA) efforts on the F/A-18F air vehicle and has included initial funding in the FY 2004 budget. The EA-18G will replace the aging EA-6B Prowler, and will be part of the F/A-18 E/F MYP. As a result of Congressional funding in FY 2003, EA-6B follow-on activities have already commenced. FY 2004 efforts will focus on risk reduction and development activities concerning the integration of EA-6B Improved Capabilities (ICAP III) electronic attack technologies into a proven air vehicle. Initial Operational Capability is currently planned for FY 2009. The Marine Corps expects to fly the EA-6B (ICAP III) until approximately 2014 to 2015 before transitioning to a new Electronic Attack aircraft yet to be determined.

## **Multi-mission Maritime Aircraft (MMA)**

The FY 2004 President's budget requests \$76 million to begin the System Development and Demonstration phase on the MMA. A down select to a final system

integrator/ provider is planned for the second quarter of FY 2004. P-3 aircraft are flying in excess of 150 hours per month in support of Operation ENDURING FREEDOM and the Global War on Terrorism. This flight regimen requires a special inspection program to allow continued operation to as much as 150% of fatigue life given the age of the aircraft. To address this critical warfighting capability the Navy is procuring a MMA with a planned IOC of 2012. The program is currently in the Component Advanced Development Phase with two competitors, Boeing with their 737 commercial-derivative aircraft and Lockheed-Martin with their modernized P-3C concept.

### **Unmanned Aerial Vehicles (UAV)**

The Global War on Terrorism has emphasized the importance of UAVs. The FY 2004 budget reflects our increased commitment to a focused array of UAVs that will support and enhance both surveillance and strike missions with persistent, distributed, netted sensors. The Navy's tactical UAV programs are focused on two areas.

#### **Unmanned Combat Aerial Vehicle (UCAV) - Navy**

The FY 2004 President's Budget requests \$116 million for UCAV S&T demonstration efforts, and \$5 million for establishment of the Joint UCAV Program Office. Leveraging our demonstration efforts, the Department will seek to improve the sensors and payloads to produce a penetrating surveillance UCAV-N with multi-mission capability as well as work towards a JSF-like joint acquisition strategy that results in the selection of a common platform capable of meeting service-unique mission requirements.

### **Precision Munitions**

#### **Joint Standoff Weapon**

The development of the Joint Standoff Weapon (JSOW) "C" has been a success with the first test achieving accuracy objectives. The dispenser variant production has been accelerated and JSOW is being delivered to deployed combat units. The FY 2004 budget request for JSOW is \$138.5 million for 429 weapons.

#### **Joint Direct Attack Munitions and Laser Guided Bombs**

The production capacity for manufacturing Joint Direct Attack Munitions (JDAM) and Laser Guided Bombs (LGBs) has been increased, largely through the expenditure of supplemental funds appropriated by the Congress. The FY 2004 request of \$277.3 for JDAM and \$81.3M for LGBs will purchase 12326 JDAM and 5288 LGB weapons respectively at rates that take advantage of the expanded capacity.

#### **Tactical Tomahawk**

Tactical Tomahawk missile begins full rate production in FY 2004. Tactical Tomahawk significantly improves performance through an improved warhead, fuzing,

and navigation improvements. This is accomplished at almost half the cost by using innovative manufacturing and production techniques. The Tactical Tomahawk completed successful developmental test shots from a simulated ground launcher in August 2002 and an underwater launcher in December 2002. The program subsequently awarded a Low Rate Initial Production (LRIP) Contract in October 2002, and exercised an option for additional missiles in January 2003, for a total of 192 missiles. The FY 2004 budget requests authority for a FY 2004 - FY 2008 MYP.

#### AIM-9X

The AIM-9X Sidewinder, a 5<sup>th</sup> generation infrared, launch and leave, air-to-air missile capable of countering current and emerging countermeasures, is currently in OPEVAL. The FY 2004 budget requests \$2.7M RDT&E for continued testing and \$104.9M WPN to purchase 531 AIM-9X missiles (167 for Navy and 364 Air Force). Low rate initial production missiles are currently being delivered to the field and fleet. The program is progressing toward a MS III 4<sup>th</sup> quarter FY 2003.

### AVIATION READINESS

Our proposed plan continues investment in key operational readiness accounts and reflects an increase in aviation depot maintenance funding and sustained funding for our flying hours accounts.

#### Flying Hour Program

The FY 2004 Budget request reflects an additional \$137M this year to sustain the investment level we established in support of last year's budget. This level of flying hours will maintain the combat readiness of our Marine Air-Ground Task Forces, enable our airwings to achieve required readiness six months prior to deployment, sustain readiness during deployment and increase our ability to surge in crisis and mitigate the risk of a smaller strike fighter force.

#### Aviation Maintenance

Last year, we reduced our aircraft depot level repair back orders by 17%; maintained a steady "mission capable" rate in deployed aircraft; and fully funded aviation initial outfitting. The FY 2004 budget request reflects an increase of over \$210M to FY 2003's investment, and will increase the number of engine spares, improve the availability of non-deployed aircraft, and meet our 100% deployed airframe goals.

### SUMMARY

The Navy acquisition team has taken many positive steps during the past year. From moving forward with deliveries of the F/A-18E/F to continued progress on the JSF and V-22 programs, the support and direction of the Congress has been essential to our progress. Through the use of innovative acquisition initiatives, our nation is maintaining

a healthy Naval aviation industrial base and an efficient and an appropriately sized infrastructure to support an optimal force structure. I am most grateful for the assistance of this Committee for the entire Department of the Navy's efforts.

In the end, our tactical aviation assets are a tool of our Sailors and Marines. Today, the Navy and Marine Corps have used all of the aircraft in that fleet to fullest degree possible, putting combat capability exactly where the nation needs as part of the Joint Force. Naval forces are also forward deployed, providing clear presence and protecting the United States' strategic interests. We have the finest Naval Force in the world. With your assistance, we will continue to improve every aspect of our business to provide the maximum capability for our Sailors and Marines and the maximum security for America.



## ***Air Dominance is Job One***

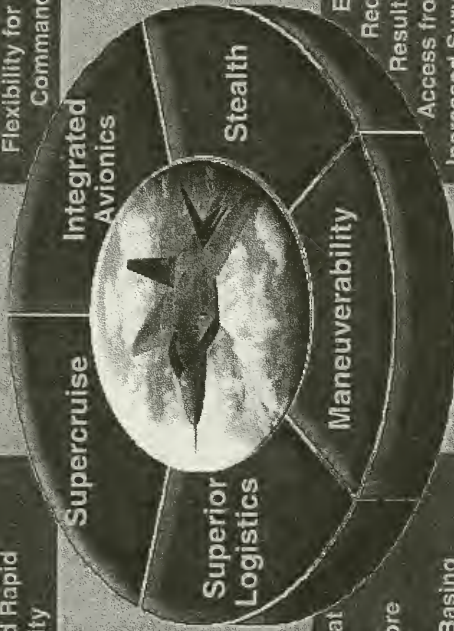
- Affords the Combatant Commander
  - Freedom from attack
  - Freedom to maneuver
  - Freedom to attack
- Counters 21st Century Anti-Access Threats
  - Surface-to-Air Missiles
  - Weapons of Mass Destruction
  - Advanced Fighters
  - Theater Ballistic Missiles
- Defends the Homeland from Emerging Threats
  - Cruise Missiles
- Permits "Around-the-Clock" Stealth Operations
  - Enables 24-hour employment of B-2 & F-117
  - Opens the door for joint and coalition employment of forces

***F/A-22 is Linchpin for Establishing Air Dominance***

# F/A-22 Capabilities

Exceeding Supercruise by 12%  
 Result: Increased Weapons  
 Employment Range  
 Result: Increased Rapid  
 Reaction Capability

Exceeding Payload Requirement  
 Result: Increased Lethality  
 Result: Greater Targeting  
 Flexibility for the Joint Force  
 Commander



Exceeding Combat  
 Range by 55 NM  
 Result: Holds More  
 Targets at Risk  
 Result: Flexible Basing

Exceeding Stealth  
 Requirement  
 Result: Full Battlespace  
 Access from Day 1,  
 Increased Survivability

## F/A-22 Meeting or Exceeding Critical Capabilities

## *F/A-22 Delivers Air Dominance*

- Air Dominance is Job One
- Assures Air Dominance for decades
- This Nation needs the F/A-22



■ This Nation needs the F/A-22 in sufficient numbers

*Only New US Aircraft to Put Weapons on Target  
this Decade*



## ***F/A-22 Progress Making Tremendous Strides***

- F/A-22 fleet eclipsed 3,000-flying hour milestone
- Envelope Expansion... 2 1/2 time increase... last 6 months
- Missile Shots... 16 fired (4 guided)... extremely successful
- Static Testing... Complete... no major issues
- Fatigue Testing... Complete... 1<sup>st</sup> life, 2<sup>nd</sup> life well underway
- Vertical fin buffet... Resolved... verifying <10K'
- Canopy howl... Fixed
- Production program metrics improving
  - Delivery schedule improving... span time reduced 11%
- 1<sup>st</sup> Operational Aircraft delivered to Nellis AFB, NV
  - Launched, flown, and recovered by operational personnel



## ***F/A-22 Affordability***

- USAF committed to “buy-to-budget” strategy
- Current production projection 276 aircraft
  - Addresses known risk areas with margin for future unknowns
- Production stability vital to achieving future affordability goals
  - Supplier confidence key element to program success (65% of aircraft cost)
- Production Cost Reduction Program (PCRP) critical enabler
  - Investing \$475M (\$85M in FY04) in Producibility Improvements

## ***F/A-22 Enables the Future Force***

- F/A-22 enables JSF development
  - JSF will leverage 500,000 F/A-22 flight hours of operational experience and risk reduction prior to IOC
    - F135 (JSF) engine derived from F119 (F/A-22) engine
    - JSF Avionics: ~30% reuse of F/A-22 mission software
- F/A-22 enables JSF affordability...pioneering high rate manufacturing techniques for stealth aircraft
- F/A-22 enables JSF operational capabilities...establishes Air Dominance...opens door for persistent force

***F/A-22 is the Pathfinder... We Must Get it Right***

DEPARTMENT OF THE AIR FORCE

PRESENTATION TO THE COMMITTEE ON ARMED SERVICES  
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE  
UNITED STATES HOUSE OF REPRESENTATIVES

SUBJECT: TACAIR Modernization

STATEMENT OF DR. MARVIN SAMBUR  
Assistant Secretary of the Air Force (Acquisition)

April 2, 2003

NOT FOR PUBLICATION UNTIL RELEASED  
BY THE COMMITTEE ON ARMED SERVICES,  
UNITED STATES HOUSE OF REPRESENTATIVES

Chairman Weldon, Ranking Member Abercrombie and Members of the Subcommittee:

Thank you for this opportunity to discuss with you the Air Force's 2004 budget plan and to report to you on our efforts and progress on acquisition reform. General Keys and I are proud to come before you today and discuss our plan for maintaining the United States Air Force as the dominant air force in the world. Your support will be vital as we work together to ensure that we continue to deliver programs that support warfighter capabilities, which are needed to ensure victory.

Over the last year, we have been very successful in implementing new changes to the Air Force acquisition process and in providing increased capabilities to the warfighter. My staff and I have been diligently working to develop processes and enhance the culture within the Air Force acquisition workforce, so as to institutionalize these changes and ensure our air dominance.

We will continue to leverage the technology of this nation to create advantages for our military forces and meet the challenges that we will face in the years ahead as articulated by the Secretary of Defense.



### **Changing Our Acquisition Process**

The Secretary and Chief of Staff of the Air Force gave us a mandate to change the way we do business to deliver capability to the warfighter. From slipping development times, to reduced deliveries, to increased costs, programs have not met established baselines and goals. During this past year, I have been working to determine the root cause of these execution problems. The findings identify several factors lead to poor program execution including: unstable requirements, faulty cost estimates, lack of test community buy-in, inadequate system's engineering and unstable funding. For the Air Force, these program execution problems result in the average cost growth of 30% for acquisition programs and the doubling of the average procurement times.

Given the problems noted above and the resulting increases in program costs and delays in program schedules, I have formulated a series of policies to address the underlying causes.

First, in order to overcome our unstable requirements process, I have implemented an Agile Acquisition Policy that demands collaboration: that is active, cooperative dialogue between the warfighter, acquirer, and tester working as one team at the outset and throughout the requirements and development process. This will ensure that warfighter requirements are clearly articulated, the acquirers communicate what can be delivered and the testers understands what needs to be verified. Surprises are kept in check when the user provides a concept of operations up front and a consistent, continuous dialogue between all stakeholders provides a robust definition of a requirement, which the acquisition community can deliver and the tester can verify.

These changes set the goal of institutionalizing collaboration throughout the Air Force and DoD acquisition to include our operations, test and sustainment communities. Collaboration must start well before a product is delivered in order to control costs and to provide the user with the required capability. When the Acquisition Enterprise, consisting of the Warfighter, Acquisition, Test, and the Sustainment community, starts working together a better product is produced.

Second, I have addressed the issue of faulty cost estimates by instituting policy changes that will foster credibility within the acquisition community. Credibility means delivering what we promise, on time and on budget. In the past, we have designed our programs with a 60-70% confidence level of meeting cost, schedule, and performance goals. In order to be credible both to the warfighters and Congress, I have implemented a 90% confidence level in meeting our requirements.

By demanding collaboration between all the parties, we can ensure the right tradeoffs are made throughout the acquisition process to meet the required goals. It is imperative that, both the warfighting and acquisition communities work together to make tradeoffs of non-critical elements within programs to buy down risk, throughout the acquisition cycle. Bottom line: credibility means delivering what we promise, on time and on budget.

Third, not having test community buy-in created problems further along in the acquisition process. As such, we have started to work with the test community on processes to reduce the number of serial events for testing. This is different from the

current process of serial and overlapping Development and Operational Testing, which can take several years. We are developing a seamless verification process to ensure that both the developmental test and operation test occur in a single process, not fragmented as it has been in the past. If the operational testers are involved early in the process, then they can assess the operational value of developmental testing and reduce duplication of effort.

Again collaboration is a vital part of this process change. By involving all members of the acquisition enterprise early and continuously, we can all come to agreements on what are the operational requirements, what can be delivered and how we will verify the systems being built meet those needs.

Fourth, we need to instill an adequate systems engineering foundation within the acquisition process. Systems engineering is one of the bedrocks of sound management for acquisition programs as it ensures that contractor-proposed solutions are consistent with sound engineering principals. Decisions based on a solid a systems engineering approach, will ensure our program managers will be better prepared to assess their programs health and will help to keep programs on budget and schedule. As such, I am implementing a process by which all future Milestone Decision Authorities will not sign out any future Acquisition Strategy Plans that lack the necessary attention to system's engineering. Additionally, I am demanding system-engineering performance be linked to the contract award fee or incentive fee structures. This link will help ensure the industry will also follow a sound systems engineering approach.

Additionally, we are rebuilding our organic system engineering foundation to provide the necessary expertise throughout the Air Force Acquisition Community.

Recently, the Center of Excellence for Systems Engineering has been opened at the Air Force Institute of Technology. Our goal is to create a reservoir of knowledge and source of best practices, which can be applied to our current and future acquisition programs.

Fifth, unstable funding is a constant problem, one that can be better managed by a more disciplined program-priority process while leveraging spiral development methods. Through our complementary processes to review warfighting capabilities and the associated execution of the programs comprising the capabilities, I firmly believe that we will have in place the ability to better manage funding instability. As funding perturbations, both external and internal, arise within our programs, our reviews will ensure that a disciplined process of flexing resources to programs that contribute the most to warfighting capabilities exists. This in effect will minimize the overall perturbation to programs that provide the most "bang for the buck" and eliminating our time-honored process of applying a "peanut-butter spread" to all.

### **Spiral Development Is Our Preferred Acquisition Process**

The Air Force has identified the spiral development methodology of acquisition as the preferred approach to acquiring systems. As the pace of technology has quickened, so must the pace of our Acquisition process. Spiral development allows the Air Force to incrementally deliver weapon system capability quickly -- providing the warfighter technology as it matures within acceptable program risk. As each spiral is more clearly defined and shorter in duration, schedules are better managed due to the shorter time exposure of the development process to internal and external change. Mutual expectations



on spiral content, cost, and schedule are also commonly understood and agreed to up-front between all stakeholders, as collaborative practices are paramount to the spiral development process.

Spiral development will also assist in mitigating funding instability by allowing the Service to compartmentalize each individual spiral such that a funding cut in the far term won't compromise a capability that is complete and ready to go to the field today. In the past our "big bang" theory of releasing weapon system capability to the field held all aspects of the weapon system hostage to any perturbation in the process. With spirals we release smaller, more tightly focused capability sooner, and minimize the risk of a long drawn-out development process being affected by funding instability in either the mid- or far-term.

Another beneficial spin-off of spiral development acquisition is the flexibility to insert the latest technology into the development and production lines. This is where the importance of a robust science and technology capacity is crucial in truly reaping the benefits of a spiral release process.

### **Capitalizing on Science and Technology**

Providing the warfighter solutions rests in large measure with research and development. Through robust investment and deliberate focus in science and technology, the Air Force invigorates our core competency of providing technology-to-warfighting. Combined with innovative vision, S&T opens the direct route towards transforming air and

space capabilities. Therefore we continue long-term, stable investment in S&T to ensure we realize future capabilities, as well as those that may immediately affect existing systems.

Some of these new technologies – UAV systems, laser-based communications, space-based radar, and others – show clear promise for near-term, joint warfighting applications. Others present opportunities we can only begin to imagine. We are exploring each of these technologies, and our investment will deliver the required capabilities to our seven AF CONOPs.

#### **Acquisition Success through new Business Practices**

The Air Force has also enacted new business practices from an integrated enterprise perspective, examining every process and process link. I have expressly given our people the latitude to make the right decisions by relaxing our past prescriptive policies. My implementation of a reality-based acquisition policy, which replaced the highly prescriptive Air Force Instruction (AFPD 63-1/AFI 63-101), provided guidance emphasizing innovation and risk management and will delegate decision authority to appropriate levels. Additionally, I have empowered our people through the use of High Powered Teaming with the warfighters, to deliver initial capability to warfighters more quickly, and add capability increments in future spirals.

Our transformation of Acquisition practices are only the beginning of a comprehensive and aggressive approach to reforming business practices. Our efforts today will have a direct effect on efficient and effective air and space capability acquisition both immediately, and in the future.

**Initiatives Show Results**

During the last year we have had several successes based on these principles outlined above. One such example is the Passive Attack Weapon. This weapon was developed as a result of a 180-day Quick Reaction Program at Air Combat Command, and was available to the warfighter at the 98-day mark. To date, we have delivered 58 weapons and completed all aircraft integration. Support elements have been delivered, and our seamless verification of the system is complete. Production was completed on time, with 15% more weapons delivered than originally proposed as we completed the program under budget.

**Weapon System Modernization****F/A-22**

The F/A-22, with its revolutionary combination of stealth, supercruise (i.e. supersonic cruise without afterburner), maneuverability, and integrated avionics, will dominate the skies. The F/A-22 will ensure U.S. air dominance against all projected future threats. In addition, when outfitted with the Small Diameter Bomb, the F/A-22's ability to penetrate an adversary's anti-access airspace and destroy his most critical air defense capabilities, will enable 24 hr stealth operations and freedom of movement for all follow-on forces-- fully leveraging our nation's asymmetric technological advantages. In 2001, flight-testing continued to demonstrate the revolutionary capabilities. Specifically, the F/A-22 successfully completed an AIM-120 guided missile launch, and initial radar detection range measurements (met specification requirements the first time out). On 14

Aug 2001, the Defense Acquisition Board approved the F/A-22's entry into low-rate initial production (LRIP). Entering operational service in 2005, this transformational leap in technology is the linchpin to preserving the nation's most important military advantage for the warfighter: the capability to rapidly obtain and maintain air and space dominance. The program continues to proceed toward full rate production. LRIP production aircraft are well into the manufacturing process; contracts already awarded include Lot 1 (10), Lot 2 (13), Lot 3 (20), and advance buy for Lot 4 (~22).

The EMD program has been restructured to resolve the EMD shortfall within the overall F/A-22 budget. Funding was re-phased from modernization and production in FY03 and from production in FY04-FY06. The modernization program was re-planned in concert with the warfighter to account for these changes while ensuring critical capabilities are brought on board when required. While the EMD shortfall and higher than anticipated Lot 3 aircraft costs did result in a revised estimate of 276 aircraft, it did not impact the Air Force's commitment to the "Buy-to-Budget" strategy. The Air Force is focused on successfully completing F/A-22 development and initiating Dedicated Initial Operational Test & Evaluation (DIOT&E). While currently scheduled to start in Oct 03, DIOT&E remains event-based and we will not begin until we are assured of success. Our greatest remaining development challenge is avionics stability, yet we remain confident we will successfully resolve this issue.

Despite the issues above, F/A-22 program has made great strides in the past 6-9 months. Not only has the flight test program increased the test point burn down rate to the point where envelope expansion is back on track, but also the vertical fin buffet challenge has been resolved, and the cause of canopy howl has been identified and a repair plan



developed. The program recently crossed the 3,000 hour cumulative flight hour milestone and has seven aircraft flying at Edwards and one at Nellis. Testing has also included 16 live missile launches (4 guided) and successful firing of the gun. Production processes during final assembly at Marietta continue to show improvement. Out of station work has been reduced significantly, part shortfalls are down 70%, and tool validation has been completed.

### F-35

Acting in concert with the F/A-22 will be the F-35 Joint Strike Fighter (JSF). The F/A-22/F-35 force mix will balance affordability, capability and force structure—critical capabilities for the Global Strike concept of operations—to ensure sufficient quantities of advanced fighter aircraft to give the US dominant force across the full spectrum of conflicts. The F-35 program will develop and field a highly common family of next-generation strike fighter aircraft for the Air Force, Navy, Marine Corps and our allies. The Air Force Conventional Takeoff and Landing (CTOL) variant will be a multi-role, primary air-to-ground aircraft to replace the F-16 and A-10 and complement the F/A-22. While the F/A-22 will establish air dominance, the F-35—with its combination of stealth, large internal payloads and multi-spectral avionics—will provide persistent stealth and precision engagement to the future battlespace. The F-35 will carry a wide array of weapons, including J-series, AMRAAM and AIM-9X. It will be optimized for all-weather, air-to-ground employment, including direct attack on the most lethal surface-to-air missile systems. F-35 planned reliability and maintainability will enable an increase in sortie generation rate and mission reliability, and will reduce the logistics footprint as compared to legacy aircraft.

The F-35 program is in the second year of the System Development and Demonstration (SDD) phase. The SDD program is employing a block upgrade approach, based upon an open system architecture, to provide early delivery of a basic combat capability followed by integration of additional avionics and weapons capabilities to support the Services' Initial Operational Capability (IOC) requirements in the 2010-2012 timeframe. Over the past year, the program has achieved several SDD technical milestones, including the Air System Requirements Review, the Integrated Baseline Reviews, the Propulsion Preliminary Design Reviews and, most recently, the Air System Preliminary Design Review for all three F-35 variants. The program is currently expected to meet or exceed all Key Performance Parameter thresholds.

The F-35 program is on track to supply 1,763 CTOL aircraft to the Air Force and to meet the Air Force's IOC goal in Fiscal Year 2011. Maintaining this schedule will ensure the optimal balance between affordably replacing aging aircraft and providing the warfighter the required force structure.

The F-35 is the DoD's largest cooperative development program. In Fiscal Year 2002, the F-35 program successfully concluded SDD cooperation agreements with seven additional international partners: Canada, Denmark, the Netherlands, Norway, Italy, Turkey, and Australia. These countries, along with the United Kingdom, are contributing over \$4 billion to the SDD program. The Department is also negotiating with Israel and Singapore regarding their participation as Security Cooperation Participants. International participation in the F-35 program will help ensure maintenance of economies of scale,

which will keep the F-35 affordable both in flyaway and support costs over the life of the program. Additionally, international participation in the F-35 program will promote appropriate US-foreign technology sharing and bring the US and our allies closer to the goal of full joint/combined warfare capability.

#### **Unmanned Combat Air Vehicle (UCAV)**

The Unmanned Combat Air Vehicle (UCAV) vision is to develop an affordable weapon system that expands tactical, and perhaps strategic, mission options and provides a revolutionary new element in the air power arsenal. The UCAV weapon system will exploit the design and operational freedoms of relocating the pilot outside of the vehicle while maintaining the rationale, judgment, and moral qualities of the human operator.

The ongoing X-45 UCAV program is a joint Defense Advanced Research Projects Agency (DARPA) / U.S. Air Force effort being conducted in multiple overlapping spirals of increasing capability towards the UCAV vision. Spiral 0 consisting of X-45A air vehicle demonstrators, mission control system, and simulators are performing well at the NASA-Dryden Flight Research Center in CA today. Spiral 1, planned for delivery in FY05, will integrate the intelligent multiple-vehicle coordinated operations demonstrated in Spiral 0 with a robust air vehicle design that offers increased range and payload. Future spirals will provide increasing capability to meet warfighter needs and enhance the effectiveness of integrated operations of manned and unmanned aircraft.

**F-15 Program**

The F-15 Eagle remains the USAF's lead air superiority and only all-weather deep interdiction aircraft well into this century. The deep interdiction version, the F-15E, provides night/through the weather air-to-surface attack, employing all USAF precision-guided munitions, including J-series weapons. The F-15 is heavily involved in OPERATIONS ENDURING FREEDOM, NOBLE EAGLE, and IRAQI FREEDOM.

The Air Force must maintain the F-15A-D's and F-15E's abilities to fulfill their roles in light of the evolving threat and world situation. Several of the current modifications to the F-15 are an upgrade to the radar (the APG-63(V)1 Radar Upgrade) to address significant reliability obsolescence problems; an upgrade to the engine (the F100-220E Engine Upgrade) to address significant reliability problems; addition of a new mission computer (the Advanced Display Core Processor) to provide computing power to support future capability growth; an upgrade of the armament control system (the Programmable Armament Control Set upgrade) to support employment of J-series weapons; and addition of high-off-boresight targeting of sensors and air-to-air weapons (the Joint Helmet Mounted Cueing System) to improve survivability in within-visual-range air combat.

A recent success story of the program is the fielding of LITENING ER pods to support current operations. Following CSAF direction, the Air Force completed a 90-day evaluation of the LITENING pod in December 2002 on F-15E aircraft. Positive evaluation results led to direction to procure and field 24 pods. Funding reallocation and Congressional approval were accomplished within 2 months, and pod deliveries began in



January 2003. There are currently 16 pods in-country supporting OPERATION IRAQI FREEDOM, and the balance will be delivered to the Air Force by 31 March 2003.

### F-16

The F-16 is the Air Force's principal multi-role fighter and is the largest Air Force and International sales procurement program with over 4,000 produced for service, encompassing 23 countries. It is currently operating within the Active, AFRES, and ANG forces. The F-16 is a single-engine, multi-role, tactical fighter, with full air-to-air and air-to-ground combat capabilities. The F-16 comprises over 50% of the precision engagement fighter force and is the Air Force's primary Suppression of Enemy Air Defense (SEAD) platform. It is extensively deployed with various ongoing operations to include OPERATIONS NOBLE EAGLE, ENDURING FREEDOM, and IRAQI FREEDOM.

The F-16 is currently projected to be in service beyond 2020. Several key modifications are underway to ensure the Fighting Falcon remains a key combat enabler. The Falcon STructural Augmentation Roadmap (Falcon STAR) is a structural modification for achieving an 8000-hour component service life. Installation is programmed for FY2004 through FY2014. The Common Configuration Implementation Program (CCIP) modification will improve the avionics commonality between the Block 40 and 50 aircraft. It combines 5 modifications into 1 modification; thereby reducing the number of times a jet is opened and maximizing configuration control. Further, it combines the Block 40 and 50 Operational Flight Programs (OFPs) into common OFPs. The CCIP modification is timed with the Air Expedition Force schedule with installations running through FY2010. Lastly, the Combat Upgrade Plan Integration Details (CUPID) modification will incorporate GPS,

data link, night vision, and countermeasures into Block 25 through 32 aircraft. We expect to complete CUPID in FY2003.

#### **Small Diameter Bomb (SDB)**

SDB will provide the following capabilities to the warfighter: Increased number of kills per pass; combat effective in adverse weather; minimized collateral damage; autonomous target attack; enhanced (>40nm) weapon standoff range; reduced logistic footprints and aircraft generation times. SDB will be compatible with the following current platforms (F-15E, F-16, F-117, A-10, B-1, B-2, B-52), and is planned for next generation platforms (F/A-22, F-35, Unmanned Combat Air Vehicle (UCAV), Predator B). Boeing and Lockheed Martin are currently competing in the two-year CAD phase with a downselect expected to occur in September 2003. Low Rate Initial Production (LRIP) will start in FY05 with a planned RAA on the F-15E in FY06. The SDB Threshold Platform is the F-15E, although F/A-22 is a major focus item in support of the Global Strike CONOPS. SDB will be a pilot program for Seamless Verification, which is intended to maximize DT, OT, and contractor test resources in conducting an effective test program in support of warfighter requirements, while minimizing test-related cost and schedule.

#### **Joint Standoff Weapon (JSOW)**

The Joint Standoff Weapon is a joint Air Force-Navy program, with the Navy as the lead service. JSOWA, INS/GPS precision glide weapon that the Air Force is procuring, is designed to attack a variety of area targets—fixed, relocatable, and mobile targets—during day, night and adverse weather conditions. JSOW enhances aircraft survivability as compared to current interdiction weapon systems by providing the capability for launch

aircraft to stand off outside the range of enemy point defenses. The F-16, B-52, and F-15E are now capable of delivering JSOWA and the B-2 will again be capable of carrying the weapons by the mid April 03. The weapon will also be integrated on the B-1 and F-35.

Last year the Air Force decided to withdraw from the JSOWB program to service armored targets and begin development of an Extended Range Wind Corrected Munitions Dispenser (WCMD-ER). The decision to add a wing kit and GPS to WCMD enhances the weapon's capability and leverages the existing inventory of tactical munitions dispensers. The new weapon will significantly contribute to the Air Force's warfighting capability. The new area attack munitions mix is based on the acceleration of JSOWA, the Sensor Fuzed Weapon and the WCMD-ER.

#### **Joint Air-to-Surface Standoff Missile (JASSM)**

The Joint Air-to-Surface Standoff Missile (JASSM) is a "kick down the door" type weapon to be used in the early stages of a war to neutralize enemy's defenses and war infrastructure by targeting high value, fixed and relocatable targets. JASSM's standoff range is greater than 200 NM. It is a conventional, precision, autonomous, low observable missile with a 1,000 lb penetrator and blast/fragment warhead. JASSM is all weather capable using GPS/INS guidance and an Imaging Infra-Red (IIR) terminal seeker.

JASSM began low rate initial production (LRIP) in FY02 with a buy of 76 missiles. Deliveries will begin in April 03. The B-52 will be the first aircraft to reach RAA (required assets available) in Sep 03. B-2, B-1, and F-16 will follow in FY04. The JASSM test program was recently stopped after two free flight anomalies. Those issues have been addressed and the USAF is confident they are fixed. The final JASSM DT test is scheduled for late March; OT will be resumed if that test is successful. The test program will be

complete in July allowing JASSM to have a full-rate production milestone decision in Nov 03.

JASSM-Extended Range (ER) is a spiral development program that will increase the range capability to greater than 500 nm. JASSM-ER will start development in late FY03 with congressional plus-up funds. Development will end in FY07 when the program will enter production with the first deliveries in FY08.

### MC2A

The MC2A will provide rapid machine-to-machine integration of information from manned, unmanned and space-based sensors. The MC2A is the next generation wide area surveillance platform designed to provide a near real-time, horizontally integrated view of the air and surface battlespace through the use of advanced sensors, network centric systems and high-speed, wide-band communications systems. The platform will be a key enabler to engage time sensitive targets with precision accuracy.

Spiral 1 capability is funded to include next generation Ground Moving Target Indicator (GMTI) for counterland mission capability, focused Air Moving Target Indicator (AMTI) supporting Cruise Missile Defense (CMD), an open system architecture for the Battle Management, Command and Control (BMC2) mission suite subsystem and growth potential for Unmanned Aerial Vehicle (UAV) control, space-based radar interface and Intelligence, Surveillance and Reconnaissance (ISR) management functions.

Future spirals are envisioned to incorporate transformational horizontal integration and C2 Constellation battle management functions, an advanced AMTI sensor, UAV control, space-based radar integration and laser communications. Available technology will determine if combining GMTI and a 360-degree AMTI sensor on a single aircraft is

possible, or whether the 360-degree AMTI sensor will be hosted on a second MC2A configuration.

### **Conclusion**

The Air Force remains focused on providing the necessary capabilities to the warfighter in order to win America's wars. These capabilities can only be achieved through effective and efficient management during the development, production, and fielding of systems. By incorporating a strong collaborative process, re-establishing our credibility, implementing spiral development, and infusing systems engineering in our acquisition process, we can overcome the tough challenges ahead.

Through our new business practices, we are providing our workforce with the tools to make decisions and changes, but this is not enough. The Air Force must provide strong support to program managers and the necessary latitude to manage systems development, production, and sustainment with limited interference. Only then can we meet the agile acquisition needs of our warfighters.

Given the limited budget and increasing needs, this is a challenge that must be met head on. We are committed to pursuing those actions necessary to make transformation work.

I appreciate the support provided by Congress and look forward to working with this Committee to best satisfy our warfighter needs in the future.

Thank you for the opportunity to provide this statement for the record.



DEPARTMENT OF THE AIR FORCE

PRESENTATION TO THE COMMITTEE ON ARMED SERVICES

SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

UNITED STATES HOUSE OF REPRESENTATIVES

SUBJECT: F/A-22

STATEMENT OF: LT GEN JOHN D.W. CORLEY  
Principal Deputy, Assistant Secretary of the Air Force (Acquisition)

April 2, 2003

NOT FOR PUBLICATION UNTIL RELEASED BY THE COMMITTEE ON ARMED  
SERVICES ON TACTICAL AIR AND LAND FORCES, UNITED STATES HOUSE OF  
REPRESENTATIVES

Mr. Chairman and members of the Subcommittee, thank you for the opportunity to appear before you to discuss the Air Force's F/A-22 program. I'm pleased to provide an update on the progress of the F/A-22 Air Dominance Fighter program. The program has made significant progress toward completion of the development program, validation of aircraft performance, delivery of production aircraft, and initiation of pilot and maintainer training. Joining me today is Brig Gen Rick Lewis, the Air Force's Program Executive Officer (PEO) for fighter and bomber programs. Rick will lead the program through its remaining challenges, and toward a full rate production decision and declaration of Initial Operational Capability (IOC).

My comments today will underscore the joint F/A-22 operational requirements to include the long-term roadmap and how the Raptor transforms air dominance. I'll also discuss the program's history through the Lot 2 award, with an emphasis on how shifting production quantities have affected affordability. Next, I'll provide a comprehensive status of both the development and production program, including the recent Lot 3 approval. Finally, I intend to address issues raised by the two recent GAO reports, specifically, why the Air Force non-concurred with the GAO's recommendations and findings. My comments will hopefully address your advance questions. Let me first begin by providing a high-level sight picture of F/A-22 themes and "take-aways."

#### EXECUTIVE SUMMARY

America needs the F/A-22 for 21st century Air Dominance. It is a key enabler in the Air Force's Global Strike Concept of Operations and the cornerstone of the Air Force's on-going transformation. The aircraft is demonstrating transformational capabilities essential to the Joint Force Commander's ability to fight and win our Nation's wars. If we hobble this program, the

best strike aircraft in the world later this decade will be F-15s and F-16s owned by other countries.

F/A-22 performance to date has been outstanding. Recent F/A-22 flight test activity has been highly successful. This is a complex weapon system for a complex era—some ‘unknown-unknowns’ only become apparent as a test program matures. We will fix the avionics stability issue—just like we’ve resolved other development challenges.

Due to the need to extend the EMD schedule, USAF leadership directed the F/A-22 program to increase its EMD budget by \$876M. This increase in the EMD estimate-at-completion is not a reflection the airplane isn’t performing and is not expected to be an architectural issue, as validated by an independent OSD assessment team. The aircraft structure is validated and robust. Static testing is complete and we’ve found no issues. The 1<sup>st</sup> lifetime fatigue testing is complete (2<sup>nd</sup> lifetime 38% complete)—again, no issues.

Production cost control and affordability have long been F/A-22 priorities. Our cost reduction program covers the gamut of cost reduction initiatives. We are investing \$475M in direct Production Improvement Plans (PIPs). Production stability is vital to achieving future program affordability goals. F/A-22 investments today are on the “critical path” for achieving aggressive JSF goals.

Like all programs, transitioning from building EMD aircraft to production aircraft has been a challenge, but Lockheed Martin aircraft production is showing significant improvement, as recent production metrics and aircraft deliveries clearly show. In fact, the Air Force has recently taken delivery of the first three production aircraft. The F/A-22 program is gaining significant momentum—we can’t let up now!

## OPERATIONAL REQUIREMENT

To ensure national security, the United States must dissuade potential adversaries from developing threatening forces or ambitions while we seek to shape the future military environment in our favor. Assuring our friends and allies of our capability and intent and thereby deterring conflict is an important pillar of the new defense strategy. If deterrence fails, we must have the means to swiftly and decisively defeat any enemy. These imperatives require US armed forces to wield overwhelming air, land, sea, and space power seamlessly to counter threats against American forces, interests, and allies. If necessary, we must leverage our interoperable asymmetric advantages to overwhelm an adversary at the time, place, and manner of our choosing.

American military forces should be organized, trained, and equipped using operational concepts to defend the homeland of the United States while simultaneously deterring forward in four critical areas of the world. We must have a joint, networked force able to swiftly defeat aggression in two of those areas, in overlapping time frames, should deterrence fail. A decisive victory in one of those areas, to include regime change or occupation, is the final goal of our defense strategy. We must have sufficient forces to conduct smaller concurrent contingencies in other areas of the world, while maintaining sufficient reinforcements, mobility assets, and strategic reserves.

Air superiority, and subsequently air dominance, is the first priority of a joint or coalition combatant commander in any theater. Advanced radar guided surface-to-air missile (SAM) systems and air-to-air missile (AAM) systems represent a potential threat to our legacy aircraft and will have a substantial negative impact on our ability to gain and maintain air dominance. Such a threat could have detrimental implications for US security.

*Air Force Concept of Operations: A Notional Scenario*

The cornerstone—and first element—of the Air Force's on-going transformation is the development and implementation of the Global Strike Concept of Operations (CONOPS). Through the Global Strike CONOPS, the Air Force projects air power, rapidly and at great distances, to *counter threats designed to deny access* to our joint follow-on forces, while denying the enemy sanctuary. Global Strike CONOPS provides effective information and space operations, while facilitating all other ground, naval, and air forces.

In a notional scenario requiring the United States to swiftly defeat the efforts of an adversary, establishing air dominance may necessitate overcoming anti-access threats (e.g., advanced SAM networks, enemy aircraft) without the use of coalition partner bases. In such a contingency, the need to accomplish our most challenging tasks come at the outset of the operation. Once air dominance is established, follow-on forces must be capable of persistent battlespace presence for precision strikes against mobile time-critical targets via integrated use of intelligence, surveillance and reconnaissance assets. As the Army's Objective Force enters enemy territory and naval forces advance into the littoral regions, the Air Force must provide situational awareness through its penetrating, persistent ISR capability. Ground forces in enemy territory may require sustained close air support and re-supply to achieve their objectives. Responsive, survivable Air Force assets, fully connected with our joint partners will fill this need. Combat tested Air Force combat controllers along with Army and Special Operations units on the ground, armed with advanced data link equipment, will communicate directly with aircrews to respond almost instantly to the Joint Force Commander's needs. Continued Air Force suppression and destruction of enemy air defenses enable coalition aircraft to complete the



systematic defeat of enemy forces. This support is required 24 hours a day when the battlespace must be accessed and air corridors kept clear for re-supply by vulnerable cargo aircraft.

*The F/A-22's Roles in the Global Strike CONOPS*

The F/A-22 program has transformed itself over the course of its development. It's more than the stealthy air superiority jet designed to counter enemy air threats envisaged during the Cold War. Rather, it retains all the air-to-air capabilities of the original design, while incorporating leap-ahead technologies that will combine air dominance, precision attack, and joint close air support functionality into a single platform to "kick down the door" in an anti-access region. For this reason, the Air Force re-designated the aircraft the F/A-22. All aspect stealth, and the ability to supercruise at greater than Mach 1.5 are unique aspects of the Raptor. These characteristics combined with extraordinary maneuverability make the F/A-22 vastly superior to any fielded or development aircraft. Its package of capabilities compliment and increase the effectiveness of the JSF as a persistent stealth asset. The F/A-22 is the linchpin for all follow-on forces and therefore resides at the heart of the Global Strike CONOPS.

The F/A-22's combination of stealth, supercruise, maneuverability, and integrated avionics distances it from legacy fighter platforms and allows for, for the first time, the full realization of the operational concepts of the 21<sup>st</sup> century. These characteristics will give US military forces unprecedented access to enemy areas of vulnerability without exposing those same forces to unacceptable losses. It radically changes the way an adversary must think about and prepare for conflict in ways no other system can. The F/A-22's all-aspect stealth allows penetration deep into enemy territory and destruction of the next two generations of double-digit surface-to-air missile systems using GPS-aided bombs. It brings stealth "into the day" by

protecting the F-117 and the B-2 around-the-clock as they counter enemy attempts to deny access to vital target centers. Avionics enhancements in the F/A-22 fire control system enable it to engage mobile ground targets anytime, in any weather, deep within enemy territory. The F/A-22's internal weapons storage reduces drag and radar reflection and so provides increased range and maneuverability. Incorporation of the Small Diameter Bomb will quadruple its precision weapons capacity and increase the number of targets serviced per sortie. It will engage emerging threats to deployed forces, including cruise missiles possibly equipped with chemical or biological warheads. The F/A-22 enables the joint fight by gaining and maintaining air dominance, and by providing ground, naval, and special operations forces unimpeded access to their targets.

In a future joint operation, when the Combatant Commander needs access and requests an F/A-22 squadron in theater, it will take less than half the current airlift requirements of just one F-15C squadron. In the near term that same Combatant Commander would have required not only additional airlift, but also F-117's and more support aircraft and still would not have achieved the same effects the F/A-22 brings to the theater. In short, that Combatant Commander might be forced to accept losses to gain access. With the F/A-22 in theater, the Combatant Commander will have a 45% reduction in aircraft turn times, 53% less manpower than an F-15C squadron, and a 37% reduction in maintenance man-hours per flight hour, enabling the persistent joint warfight with a smaller footprint. The expected demands for the F/A-22 capabilities in a joint warfight could easily result in a low density/high demand (LD/HD) asset.

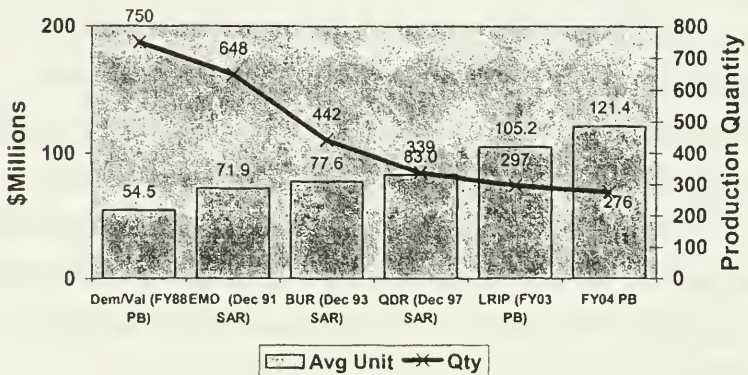
To summarize, America needs the F/A-22 in sufficient numbers for 21st century *Air Dominance*—this aircraft is the key enabler in the Air Force's Global Strike CONOPS. The F/A-22 is the only aircraft capable of countering anti-access threats--advanced SAMs, cruise missiles,

fighter aircraft, theater ballistic missile and weapons of mass destruction sites--from Day 1. Its unrivaled response makes it a key element for homeland security and force protection abroad. The F/A-22 will allow joint and coalition forces to operate with impunity 24 hours a day, to include around-the-clock employment of all other current and future stealth platforms. The F/A-22 is vital to our national interests.

### PROGRAM HISTORY

Before discussing the current status of the development and production programs, we need to review the program's production profile history, particularly how changes in total production quantities have affected affordability.

**Average Unit Fly-Away Cost (\$BY03)**



#### *Pre-1999 Quantity Changes*

In 1985, at the beginning of the Advanced Tactical Fighter Demonstration/Validation phase, the Air Force planned to procure 750 aircraft at a rate of 72 per year. Production years spanned 1992 to 2005. Following the 1990 Major Aircraft Review, the DoD reduced the aircraft

production rate from 72 to 48 per year. In 1991, at the start of the Engineering and Manufacturing Development (EMD) phase, the Defense Acquisition Board (DAB) again reduced the total F/A-22 procurement to 648, with production scheduled to occur between 1996 and 2012.

Then as part of the 1994 Department of Defense Bottom-Up Review, the F/A-22 procurement program was further reduced to 442 aircraft. In June of 1996, the Air Force chartered a Joint Cost Estimate Team (JET) to review F/A-22 program costs, both development and production. The JET recommended a restructured production program to offset the costs associated with a nine-month extension of the F/A-22 EMD program. The production ramp rate was reduced and four Pre-Production Verification (PPV) aircraft were deleted, thereby reducing the total procurement to 438 aircraft. The PPV aircraft were to be used solely for Operational Test and Evaluation (OT&E). As a cost savings measure, the Air Force deleted these four aircraft and elected to use two EMD aircraft and the first two production aircraft to satisfy OT&E aircraft requirements.

As the JET recommendations were being finalized, the 1997 Quadrennial Defense Review (QDR) emerged with a new F/A-22 production quantity. The QDR reduced F/A-22 procurement from 438 to 339 aircraft, reduced the Low Rate Initial Production (LRIP) ramp rate by 12 aircraft, and reduced the maximum production rate from 48 to 36 per year. Collectively, these quantity changes represent a 48% reduction in production quantities since the start of F/A-22 EMD. The reduced quantity has been the most dominant factor in increased F/A-22 production unit costs. Cost estimate models indicated that changing a total procurement of 750 aircraft at a rate of 72 aircraft per year to 339 aircraft at a rate of 36 aircraft per year resulted in a 52% increase in the aircraft fly-away cost. It is reasonable to expect that further reductions will

have a negative impact on future aircraft lot proposals and negotiated settlements.

#### *Production Representative Test Vehicles*

In December 1998, the Air Force awarded contracts to fully fund two post-EMD aircraft and to initiate long lead for the next six aircraft. The first two aircraft were originally designated Lot 1 but later re-named Production Representative Test Vehicles (PRTV) aircraft. These two PRTV aircraft were produced (and have been delivered) to support Dedicated Initial Operational Test and Evaluation (DIOT&E). Following DIOT&E, these two PRTV aircraft will be delivered to the Air Combat Command (ACC) at Nellis Air Force Base, Nevada.

After the PRTV aircraft contract was awarded in December 1998, the Department of Defense (DoD) planned a Low Rate Initial Production (LRIP) decision for November 1999. The acquisition strategy approved by the Air Force Service Acquisition Executive (SAE) was to approve full production of six F/A-22 aircraft (then-production Lot 1) and initiate long lead funding for the next ten F/A-22 aircraft (then-production Lot 2).

The Fiscal Year (FY) 2000 Appropriations Act directed a funding appropriation change for the second annual procurement of post-EMD aircraft. The appropriation was changed from procurement funds to Research, Development, Testing, and Evaluation (RDT&E) funds. The lot nomenclature for the six aircraft was also changed from Lot 1 to Production Representative Test Vehicle II (PRTV II). This action was taken in lieu of an LRIP decision in November 1999. The result allowed procurement of six additional test aircraft to meet the ACC requirement for F/A-22 Force Development Evaluation (FDE) at Nellis AFB. Combining the two PRTV lots fulfills the requirement for eight FDE aircraft at Nellis AFB. This also maintained F/A-22 development



and production schedules and preserved the acquisition strategy designed to meet program affordability objectives.

In December 1999, within the guidelines established by the Fiscal Year (FY) 2000 Appropriations Act, the Under Secretary of Defense (Acquisition and Technology) approved full contract award for the six additional PRTV II aircraft and Advanced Buy for ten Lot 1 aircraft. This acquisition strategy balanced risk associated with concurrent EMD and production with the risk of program cost increases caused by a break in manufacturing for both prime contractors and subcontractors.

#### *Low Rate Initial Production (LRIP)*

The next planning date for the LRIP Defense Acquisition Board (DAB) was December 2000 and was intended to authorize full funding of 10 Lot 1 aircraft and Advanced Buy for 16 Lot 2 aircraft. The LRIP DAB was delayed pending completion of two EMD exit criteria.

Also in December 2000, the Air Force completed an update to the Service Cost Position (SCP) and determined the program exceeded the Congressional production cost cap by \$2B. To address this issue, the Air Force revised the production acquisition plan to reduce aircraft quantities in the LRIP lots, while maintaining the total 339 aircraft buy within the existing cost cap. This revised acquisition strategy realigned the LRIP lot buy quantities as follows: Lot 2 was adjusted from 16 to 13, Lot 3 from 24 to 23, Lot 4 from 36 to 27, and Lot 5 from 36 to 32. Full Rate Production Lots (Lots 6-10) were also adjusted by increasing the ramp rate from 36 to 38 in each of these years, and Lot 11 was adjusted from 29 to 38.

All exit criteria were completed on 6 February 2001, but because the Defense strategic review had been initiated, the Secretary of Defense elected to further delay the LRIP DAB. To avoid a break in production resulting from a delayed LRIP decision, the DoD requested and

received Congressional approval to extend the Lot 1 Advanced Buy contract. This Lot 1 extension was funded by re-programming FY 2001 Lot 1 procurement funds into the Lot 1 Advanced Buy account. Congress released funds necessary to extend the funded period of performance through September 2001.

The Under Secretary of Defense (Acquisition, Technology, and Logistics) convened a DAB on 14 August 2001 and determined the program was ready to enter Low Rate Initial Production. In a 14 September 2001 Acquisition Decision Memorandum (ADM), he documented LRIP approval, and granted authority for Lot 1 full award and Lot 2 Advanced Buy.

The DAE also reviewed the program on 18 October 2001 and approved Lot 2 full award, Advanced Buy for Lot 3, and exit criteria for Lot 3 full award and Lot 4 Advanced Buy. Based on OSD/CAIG estimates, the program baseline was established at 297 production aircraft. However, the Air Force requested authority to procure additional aircraft above the baseline within available and projected funding. A 19 October 2001 ADM approved this "Buy-to-Budget" strategy in order to maintain the Air Force's production ramp rate to an objective quantity of 339 aircraft.

Initial preparations for the Lot 3 and Lot 4 Advanced Buy DAB (originally scheduled for October 2002) were initiated in early Summer 2002 by an OSD-directed Defense Planning Guidance (DPG) study to determine the correct number of F/A-22's required to fulfill mission requirements. *In the midst of the instabilities created by this latest round of total quantity discussions and studies, the prime contractor and suppliers began building their proposals for Lot 3 full award and Lot 4 Advanced Buy.*

## PROGRAM STATUS

### *Engineering and Manufacturing Development (EMD)*

The F/A-22 EMD program formally began in August 1991, with a sole-source contract award to Lockheed-Martin. The EMD program has been very successful in fulfilling the warfighter's most stringent requirements. The progress we've made is often forgotten by the "recency effect," whereby we over-inflate the challenges of today relative to the whole of the program. In reality, we've overcome multiple development challenges and have delivered a set of capabilities some thought impossible. Before discussing the EMD program's recent cost estimate-at-completion (EAC) increase and remaining hurdle—avionics software stability—I'd like to express just how well this aircraft is performing.

The aircraft performance-to-date has been nothing short of outstanding. *In fact, the F/A-22 is meeting or exceeding all eight aircraft performance-related Key Performance Parameters (KPPs).* KPPs represent the select subset of requirements the warfighter is simply not willing to fight without or trade-off to save cost or schedule. These KPPs derive directly from the F/A-22s key attributes of stealth, supercruise, advanced maneuverability, and integrated avionics. Flight testing-to-date demonstrates that these key attributes, when combined, create the unmatched set of capabilities needed to implement the Global Strike CONOPS and to overcome anti-access environments.

All-aspect stealth reduces the enemy's ability to find, track, and target; and allows access to areas inaccessible to non-stealth platforms. The F/A-22 radar cross section has now been verified on three airframes. In all three cases, the measured radar cross section is better than the requirement. Supercruise, defined as the ability to fly in excess of 1.5 Mach without the use of fuel-consuming after-burner, dramatically increases battlefield access and control, reduces

exposure to threats, and increases weapons delivery ranges. Supercruise is not about "going fast"; rather it is about the battlespace effects of "going fast". The F/A-22's supercruise performance exceeds the warfighter's requirement by 12%. Advanced maneuverability assures a distinct advantage in a within-visual-range engagement. Flight test data shows the F/A-22's airframe design, in combination with its pioneering thrust-vectoring engine exhaust nozzles, meets the stringent maneuverability requirement. The F/A-22's integrated avionics--again, being done for the first time by this program--tasks, processes, de-conflicts, and displays multiple sensor inputs for the pilot. Integrated avionics gives the pilot unprecedented and instantaneous situational awareness that allows him to manage the air battle rather than interpreting multiple sensor inputs. Though we're working to increase the integrated avionics software run-time (a topic I will return to momentarily), between software re-starts the performance of the integrated avionics package, to include the underlying radar, communication, navigation, and identification (CNI), and electronic warfare (EW) sensors and sub-systems, meets the warfighter's requirements. All the Raptor avionics sub-systems are working very well.

The remaining three Key Performance Parameters are related to supportability and are defined to be system maturity KPPs, meaning the warfighter expects these parameters to be achieved by 100,000 flight hours. (The Raptor flight test program is currently at 3,000 flight hours.) To assess progress toward the supportability KPPs, the F/A-22 program office runs an analytical model that requires numerous inputs and assumptions. According to the model, we are currently meeting two of the three supportability KPPs (the independent airlift KPP is estimated to be 8.8 C-141 equivalents per aircraft squadron, vice the requirement of 8.0). The model lags changes we make to how we support the aircraft (e.g., parallel tasks), and therefore requires frequent updates. We fully anticipate we will meet the airlift KPP by system maturity.

In addition to strong performance on the KPPs, the EMD program also successfully completed *every* calendar year 2002 development exit criteria. In particular, we finished the year with two highly successful end-to-end guided missile shots, one a supercruise AMRAAM shot and the other a supersonic AIM-9 shot.

Though the EMD program continues to make strong progress, it has not been without cost growth. The EMD program has been forced to resolve and pay for unplanned development-related issues, and past decisions to assume risk in order to cut costs. The most prominent development-related issues include properly characterizing the F/A-22's fin buffet response, and resolving avionics instability. The net effect of these issues is cost growth driven by schedule extensions that extend the completion of EMD to November 2005 (from March 2004). The schedule extension affords more time to complete flight envelope expansion (which was slowed while we conducted fin buffet response testing), and avionics development and flight testing.

We completed all fin buffet response testing above 10,000 feet, resulting in only minor structural modifications to the tails (replacement of composite vertical fin rear spar with Titanium and strengthening of a rudder fastener). We incorporated these modifications into the production line for Lot 2 and are incorporating low cost retrofits on all prior aircraft (\$2M). The aircraft has no flight envelope restrictions in the fin buffet region above 10,000 feet. Fin buffet response testing for the region below 10,000 feet will begin in May 2003, in conjunction with planned <10,000 feet envelope expansion testing. Based on analysis of the fin buffet region below 10,000 feet, we currently predict no need for further modifications.

In response to the additional costs incurred to resolve these issues, in August 2002 the F/A-22 program office completed a bottom-up 50% confidence cost estimate review of the remaining EMD work and concluded that the EMD budget required an additional \$690M.



Senior Air Force leadership then chartered an independent "Red Team" to investigate both the existence and magnitude of EMD cost growth. In December 2002, the Red Team outbrief confirmed an increase in the EMD in the range of \$700M to \$1B. To regain confidence in the program, senior Air Force leadership directed the F/A-22 program to increase the F/A-22 budget by \$876M. They also directed that the \$876M be sourced from within the F/A-22 overall budget. Shortly thereafter (also in December 2002), the Air Force briefed the Professional Staff Members (PSMs) from the Defense Committees of the EMD EAC increase. As a result, the FY04 President's Budget (PB) submittal reflects \$113M sourced from the F/A-22 post-EMD modernization RDT&E account and \$763M sourced from the F/A-22 aircraft production account. With the additional \$876M, the F/A-22 EMD total program budget stands at \$20.3B (then-year dollars); a 4.5% increase.

Part of the \$876M pays for infrastructure previously declined in order to reduce costs (i.e., the adage "you can pay me now or pay me later" rings true). For example, early in the program we opted not to fund a second Avionics Integration Laboratory (AIL). We are now standing up a second laboratory in Marietta, Georgia in order to alleviate the software burden at the AIL in Seattle. The Marietta AIL (formally called the Raptor AIL, or RAIL) will allow the Seattle AIL to focus efforts on improving software stability.

It is important to recognize that the *EMD cost growth does not indicate a concern regarding aircraft performance, nor does it represent an increase in retrofit risk*. As already stated, the EMD program is making significant strides toward completion of all development requirements, the aircraft is performing well, developmental issues are being resolved, and past cost-cutting "sins" are now being funded. In short, the Air Force will complete the EMD program to deliver an ORD-compliant aircraft to the warfighter.

Looking ahead, the next major program milestone is entry into DIOT&E. Consistent with the F/A-22 program philosophy, DIOT&E is an event-driven milestone—we will not begin DIOT&E until we are ready to succeed. Accordingly, because the EMD program is taking longer, we moved the projected start date for DIOT&E from August 2003 to October 2003. To fully understand the move, we need to review our four prerequisites for entry into DIOT&E. First, we must complete Logistics preparations to include Technical Order Data (TOD) deliveries, maintainer training, and maturation of the Integrated Maintenance Information System (IMIS). All these logistics items are on-track and are going well. TOD deliveries are ahead of previous jets at this phase of development. Currently, 91% of all aircraft procedural tasks are completed. The IMIS software recently completed a very successful integration test to ensure it interfaces with the overarching Air Force logistics management system called the Core Automated Maintenance System (CAMS). Maintainer training at Nellis AFB, Nevada, has already begun. We expect no logistics issues in meeting an October 2003 DIOT&E start date.

Second, in order to execute DIOT&E, the Air Force Operation Test and Evaluation Center (AFOTEC) requires four production representative jets, and one spare. Aircraft #4008-4011 are allocated for that purpose and have already been delivered to the government. Because these jets were placed on contract concurrent with the EMD development, changes resulting from EMD must be folded into these jets to ensure they are production representative. These modifications are nearing completion at Palmdale, California. These four jets will be used to train the OT pilots, and, in fact, OT familiarization pilot training has already commenced using other EMD jets. OT pilot training will ramp-up in earnest soon and we expect it to last approximately six months.

Third, we must release the DIOT&E flight envelope. In July 2002, we dramatically changed the way we execute flight envelope testing. Since then, we've experienced a 2 1/2 fold increase in the rate of test point execution and project that the DIOT&E flight envelope will be cleared by mid-September 2003, giving sufficient time prior to the start of DIOT&E.

Finally, we must to deliver a stable and fully-tested version of 3.1.2 (the nomenclature "3.1.2" simply denotes a specific level of required functionality) avionics software to the OT testers before DIOT&E can begin. This prerequisite represents the F/A-22 program's key challenge. As previously stated, when the avionics software is up and running, the performance of the weapon system is outstanding. The issue is not how *well* it performs; rather it is how *long* it runs. Since December 2002, we have been successful in improving avionics run-time in the AIL. We must find a way to translate these improvements to the flight test jets. Current software run-times in the flight test jets sit at 1.3 hours Mean Time Between Instability Events (MTBIE). Our efforts to resolve software instability is another contributor to the EMD EAC increase because we have had to release additional unplanned software builds and the software instabilities affect how efficiently we conduct flight test.

In December 2002, Secretary Aldridge chartered the OSD Avionics Advisory Team (AAT), an independent team made up of software experts from DoD, industry, and academia to assess the state of the current F/A-22 avionics software and assist in the resolution of stability issues. The AAT effort is already providing benefits to the F/A-22 program. The team offered recommendations in the areas of tooling and testing methodologies to assist in determining and correcting the root causes of the software instabilities. The F/A-22 program office is currently implementing the AAT recommendations and the revised program schedule supports 60 days in

which to incorporate the AAT recommendations and get back on track. The difficulties with avionics software are the main driver for slipping DIOT&E start to October 2003.

To summarize the state of the avionics instability issue, we have an OSD/Air Force joint plan to improve software run-time, the plan is based on sound systems engineering principles and the advice of recognized industry experts, and the plan is executable within the re-baselined EMD cost and schedule parameters. The software integration techniques we're employing on the Raptor are quite complex. Though we are the first program doing this level of integration, we are already not alone. We are the pathfinder. Other programs, like JSF, will leverage our efforts. There are engineering lessons to be learned, as well as exposure to the types of problems associated with an integrated avionics application. Furthermore, providing this capability to the warfighter will help crystallize what is desired on the JSF.

#### *Production*

The FY 1998 Defense Authorization Act implemented a \$43.4B production cost cap and instructed that this cost cap be adjusted annually for inflation. The current cost cap value sits at \$36.8B (\$FY03), after adjusting for annual inflation effects and subtracting the cost of the six PRTV II aircraft paid for using RDT&E funds.

In a 14 September 2001 Acquisition Decision Memorandum (ADM), the Defense Acquisition Executive, Secretary Aldridge, approved a revised program baseline and acquisition strategy that added \$2.0B to LRIP and \$3.4B to full rate production (total of \$5.4B), and directed the Air Force to fully-fund the production program accordingly. This action established a threshold quantity of 297 production aircraft (includes the two PRTV I jets), and incentivized the Air Force to strive for an objective quantity of 333 aircraft. *This ADM instilled the "Buy-to-Budget" acquisition strategy, which is still in effect today.* "Buy-to-Budget" means the Air Force

can maximize aircraft quantity within the OSD-approved \$43B budget cap.

Of note, the OSD-approved budget cap exceeds the current inflation-adjusted Congressional production cost cap. In recognition of that fact, Secretary Aldridge sent a 13 September 2001 memorandum to the defense committees that relayed his approval of the new acquisition strategy and revised production cost baseline, and requested Congress remove the Congressional production cost cap.

In the FY03 PB, the DoD submitted an F/A-22 production program budget consistent with the \$43B OSD-approved budget cap, in accordance with the "Buy-to-Budget" strategy and 14 September 2001 ADM. This means that cost savings initiative return multiples, learning curves, savings from a future Multi-Year procurement contract, and ultimately, total aircraft quantity are all predicated on a total production budget of \$43B. At the current buy profile, the F/A-22 program will not eclipse the \$36.8B Congressional production cost cap until FY09. Therefore, the apparent disconnect between the Congressional production cost cap and the OSD-approved budget cap is not yet an issue. That said, before the program can enter into an Economic Order Quantity (EOQ) and Multi-Year Procurement (MYP) agreement, currently planned for FY 2006 and FY 2007 respectively, the Air Force will need relief from the Congressional production cost cap. Predicated on successful completion of DIOT&E and a positive full rate production decision, we will formally seek relief from the Congressional production cost cap via language in the FY 2005 Defense Authorization Act. Securing FY 2005 language provides adequate time to proactively plan for a FY 2006 EOQ.

Based on OSD and Air Force leadership direction, the F/A-22 *production* program sourced \$763M of the EMD EAC increase. Consistent with that direction, the DoD submitted an FY04 PB that reflects an F/A-22 production total budget of \$42.2B (\$43B minus \$763M). In



summary, it is my hope that this explanation clears up much of the confusion surrounding why there are three different production budget figures. Please note that all my comments from here forward are with respect to the FY04 PB production position of \$42.2B.

As I mentioned under the discussions on 'Program History,' Lockheed and the suppliers were building their proposals for Lot 3 full award and Lot 4 Advanced Buy right at the same time the program was experiencing external production quantity discussions.

With that as a background, the Lot 3 and 4 quantities now stand at 20 and 22 (vice 23 and 27 as documented in the FY03 PB). These reductions in both lots are due to two factors: the transfer of production funds to the EMD account to source the EMD EAC increase, and the higher-than-expected Lot 3 and 4 Advanced Buy negotiated price (i.e., aircraft affordability).

At this point in the program, we can model price performance-to-date and predict a total aircraft quantity within the \$42.2B budget with confidence. Our current estimate is that we will be able to procure 276 total F/A-22s. This estimate is based on a number of conservative assumptions that get to the heart of why the DoD non-concurred with the GAO's recommendations and findings. Simply stated, this revised estimate already includes the factors annotated by the GAO. Further, in their independent cost estimate, the OSD/CAIG predicted that for \$42.2B, the Air Force can procure 270 F/A-22s, which is within 3% of the Air Force estimate. This is remarkable; in the past the OSD/CAIG and Air Force production estimates differed by as much 11%. The gap has closed because, with three lots plus PRTV jets on contract (51 jets total), we now have a better understanding of production costs and assumptions for future expected production savings.

At the 27 March 03 DAB, Secretary Aldridge approved the Lot 3 full award contract and the program office subsequently finalized the Lot 3 contract for 20 aircraft. Hence, the current state of the program has LRIP Lots 1 -3 on contract, and Lot 4 Advanced Buy on contract.

It is worth noting that, though the aircraft affordability is not what we initially hoped, and contrary to many misconceptions, *the aircraft are getting cheaper*. At this point, we expected to be following an 85% learning curve, when actual performance shows us closer to an 88% learning curve. *The below table shows the downward trend in fly-away costs* for lots on contract.

Aircraft Lot Fly Away Costs (TY \$M)				
PRTV I (2 a/c) FY99	PRTV II (6 a/c) FY00	Lot 1 (10 a/c) FY01	Lot 2 (13 a/c) FY02	Lot 3 (20 a/c) FY03
\$319M	\$298M	\$210M	\$214M*	\$184M

\* The Lot 2 flyaway is artificially higher than Lot 1 because, starting in FY02, Producibility Improvement Plans (PIPs) were funded strictly from the procurement account and the level of PIP funding rose significantly that same year. A downward trend in fly-away cost is still clearly evident.

With that as an understanding of the current state and estimate for total quantity, let me say I am *not* satisfied with the estimate of 276--and we are taking steps to increase it.

Maximizing final quantity involves two key elements.

The first key element is production stability. I believe the Summer 2002 DPG Study, as well as all the quantity discussions that continue to surround the program, had a direct negative impact on the Lot 3 proposals and eventual Lot 3 contract settlement. Any program office is at a disadvantage during negotiations whenever the contractor and suppliers perceive uncertainty and lack of long-term commitment. Now would be the worst time to decrement production funds; we're at a critical stage in the production ramp and the affordability learning curve. The tools, training, and people are in place for an orderly ramp up to max rate production. Let me spend a few minutes sharing our progress in getting up to max rate.

The operation on the production floor at Marietta is rapidly gaining momentum. As expected in any production program in its infancy, we've had growing pains. These growing pains are best evidenced by the number of months aircraft are delivered late. To address these late deliveries, Lockheed-Martin and the Air Force have been working together to implement initiatives in the areas of manpower, lean manufacturing, Producibility Improvement Plans (PIPs), parts availability, quality assurance, facilities, and management systems. Our efforts are paying dividends. We track key production metrics to ensure these initiatives translate to decreased costs. Some of these metrics include span time (amount of work days required from the first final assembly station to aircraft delivery), parts shortages (number of parts not available when they are needed), and out-of-station work hours (number of hours performing manufacturing tasks that should have been performed at a previous station). For all three metrics, we've made significant decreases just in the last six months. Between aircraft #4010 (delivered October 2002) and #4012 (delivered December 2002), we've reduced span time by 11%. Since September 2002, we've reduced parts shortages by 72%. And, since November 2002, out-of-station work hours are down 56%. Of course, the real proof is in aircraft deliveries. During calendar year 2002, Lockheed reduced late aircraft deliveries from 12 months late to 7 months late. At the current rate of improvement, we expect aircraft deliveries to be back on contract schedule by July 2004, at aircraft #4035.

The Air Force has now taken delivery of the first three production Raptors, the third being the first Raptor for Air Combat Command (#4012). With the arrival of #4012 at Nellis Air Force Base, we formally stood up the first operational Raptor squadron, on 17 January 2003.

It is important to recognize lessons learned from the C-17; we can never fully recover lost efficiencies in that program. Cutting the C-17 total quantity from 210 down to 40 and then

increasing it back again to 180 cost the DoD 79% more per aircraft, or over \$22B total. Supplier confidence is a key element to a program success. In the case of the F/A-22, 65% of the aircraft cost is wrapped up in the supplier base. In addition, our investments today in the F/A-22 program are on the "critical path" for achieving aggressive JSF goals.

The second key element for maximizing final aircraft quantity is something the program office and contractor team have much more explicit control over: *Production Cost Reduction Projects (PCRP)*s. Because this is an area emphasized within this year's GAO reports, I need to discuss the genesis and current status of the overall PCRP program, and its categories.

Production cost control and affordability have long been critical focus priorities for the F/A-22 team. In June 1996, the Air Force Assistant Secretary for Acquisition commissioned a joint government/contractor team of experts, the F/A-22 Joint Cost Estimating Team (JET). The team was chartered to develop the most probable F/A-22 production cost and identify realistic initiatives to promote lower production costs. When the JET presented their findings and results in 1997, the initial estimate for F/A-22 production of 339 aircraft, without the benefit of the PCRP, was \$61.0 billion. Leveraging JET recommendations to reduce production costs, the Air Force and contractor team initiated a comprehensive cost reduction program in 1997. To meet the production program affordability goals, the Air Force and contractor team identified a set of PCRP's to lower production costs.

The initial PCRP's included initiatives in areas of producibility improvements, process changes, adoption of new manufacturing techniques, and implementation of Acquisition Reform principles. The airframe and engine contractors have on-going programs to identify additional cost savings initiatives. The F/A-22 team (government and contractor) manages the PCRP program using jointly-developed contractor-executed tracking and measurement procedures. In

addition, the results are briefed quarterly to Secretary Aldridge. To facilitate tracking of PCRPs, the contractor developed a computer database, which provides the team on-line access to get immediate and accurate status of any given PCRP effort. We have several categories of PCRPs.

- Producibility Improvement Projects (PIPs): PIPs are investments to improve manufacturing processes or incorporate new technology to reduce costs, and are key to the long-term affordability of the F/A-22. PIPs require up-front investments to bring down the unit cost of the system. The tables below compare the actual F/A-22 PIP investments to the original plan. In Fiscal Years 2001 and 2003, we funded PIPs at a higher level than the original plan, while in Fiscal Year 2002, we funded PIPs below the original plan. *However, in the aggregate, we have funded PIPs at the originally planned total level.*

Actual Investment Profile (TY \$M)								
	FY00	FY01	FY02	FY03	FY04	FY05	FY06	Total
PIP Investment								
Air Vehicle (Proc)			97.00	172.80	68.85	16.20	8.10	362.95
Air Vehicle (PRTVII)	7.50	16.50						24.00
Engine (Proc)		5.50	26.30	34.20	16.15	3.80	1.90	87.85
Engine (PRTVII)	0.50							0.50
Total Investment								475.3

Originally Planned Investment Profile (TY \$M)								
	FY00	FY01	FY02	FY03	FY04	FY05	FY06	Total
PIP Investment								
Air Vehicle (Proc)			138.00	145.80	68.85	16.20	8.10	376.95
Air Vehicle (PRTVII)	7.50	2.50						10.00
Engine (Proc)		5.50	26.30	34.20	16.15	3.80	1.90	87.85
Engine (PRTVII)	0.50							0.50
Total Investment								475.3

It is important to note that PIP return multiples range in "quality." For example, our PIP for implementing a new forging process that reduces the amount of raw titanium and machining



time for four bulkheads has a return multiple of 55. With an investment of \$1.3M, this forging PIP will save over \$70M. Of course, we do not expect all PIPs to bear that amount of fruit; hence, we rack and stack expected PIP performance and fund those PIPs with the largest expected pay-off. *Our current estimate of 276 aircraft is based on full PIP funding and a conservative average return multiple for all past and planned future PIPs. We believe this is a prudent approach.*

- Lean Enterprise: The application of Lean principles optimizes process flows, improves quality, and reduces cycle times and inventories. Lean application uses the “Lean tool kit” developed by academia and industry to focus all involved personnel on the elimination of waste at three levels within the F/A-22 Program: on the factory floor, above the factory floor (office and engineering improvements), and at the suppliers. Lean training has and continues to encourage idea generation at all levels within the program. An example of one of our Lean initiatives involved improving the process sequence for coating the wing stub lower access panel. We were able to reduce the cycle time for this process from 608 to 341 hours.

- Diminishing Manufacturing Sources (DMS): As parts are no longer produced (also referred to as an out of production part or OPP), a strategy on redesign rather than remanufacture has the potential to reduce recurring unit costs through the utilization of newer, improved technology.

- Material Efficiencies: Utilizing improved buying strategies and supplier alliances are lowering the cost of raw material and purchased parts (e.g., team-wide and company-wide raw material and hardware procurements).

- Performance Based Contracting (PBC): PBC flows down acquisition reform principles into subcontractor business arrangements. Examples include Modified Requirements

Contracting, Partnership Analysis and Source Selection processes, selective use of financial incentives to motivate cost management, and effective use of Single Process Initiatives. Since the majority of F/A-22 work is done via subcontractors, acquisition reform flowed down to subcontractors is an important part of the F/A-22 affordability strategy.

- Multi-year Procurement (MYP): Permitting the acquisition of known requirements for more than one year allows the contractor to conduct production and capitalization planning in a more efficient manner, even though total funds required for subsequent lots are not available at the time of contract award. We currently plan to enter in a MYP contract in FY 2007, for Lots 7-11. This represents a delay in our original plan of one year; the delay is necessary, commensurate with a delay in completing DIOT&E and securing a positive full rate production decision. *The savings lost from delaying the MYP are already included in the new quantity estimate of 276 aircraft.*

- Rate Savings Due to Joint Strike Fighter (JSF): The increased business base at the prime site and at the suppliers due to the procurement of the JSF will result in savings to both programs through reductions in manufacturing and general and administrative overhead rates. Additionally, the commonality in parts and processes will offer savings to both programs. These savings are captured in Forward Pricing Rate Agreements (FPRA) used to price out cost estimates. Since these savings are embedded within our estimates, there is no separate break-out of cost savings due to JSF. *The most current expected savings due to concurrent F/A-22 and JSF workload are already included in the new quantity estimate of 276 aircraft.*

The process of defining PCRPs has been on-going since the JET program review. With the criticality of PCRPs to meet program affordability objectives, the F/A-22 team built an efficient management structure to jointly oversee the development and implementation of PCRP projects.

The management effort includes an on-line interactive database that allows real time reporting of PCRCP status spanning idea generation, approval, implementation and tracking. We will continue to aggressively manage the PCRCP program, to include fully funding the originally planned PIP program.

### ISSUES RAISED BY GAO REPORTS

The GAO published two reports in 2003 related to the F/A-22. These reports were GAO-03-280 "DoD Needs to Better Inform Congress about the Implications of Continuing F/A-22 Cost Growth" and GAO-03-431 "DoD Should Reconsider Decision to Increase F/A-22 Production Rates While Development Risks Continue." The DoD formally non-concurred with both of these reports; however, I'd like to take this opportunity to provide the Air Force perspective.

#### *GAO-03-280: Recommendations and Air Force Position*

1. The Secretary of the Air Force make funding of PIPs at the planned level a priority

Air Force Position: The SECAF has committed to funding \$475M in PIP investments, consistent with the originally planned level. These investments were fully funded in FY03 and are fully funded in the FY04 budget submission.

2. SECDEF provide Congress with documentation showing PIPs are being funded at the planned level, reflecting the potential cost of F/A-22 production if cost reductions do not offset cost growth as planned, and reflecting the quantity of aircraft DoD believes can be procured with the existing production cost limit

Air Force Position: the Air Force is committed to full disclosure with the Congress. We have consistently provided updates to Congress on the status of our production program, planned investments, and projected returns on those investments.

*GAO-03-280: Air Force Comments on other Findings*

- DoD still estimates that the cost of production will exceed the cost limit established by Congress

Air Force Position: The Defense Acquisition Board, in Aug 01, approved the Air Force to plan and program for a \$43B production program. The Air Force recognizes that this program exceeds the Congressional Cost Cap by ~\$5.4B. The Air Force has informed the Defense Committees of this plan and is working with OSD and the Congress to get relief from the existing cap; however, the USAF recognizes that relief must be granted prior to exceeding the Congressional cap.

- The Air Force has not fully funded certain cost reductions plans called PIPs

Air Force Position: As of FY03, the Air Force has fully funded all planned PIPs. The GAO is correct in that the Air Force did defer some PIP investments in FY02; however, those investments were funded in FY03. The FY04 PB submission also fully funds PIPs.

- The OSD current production estimate does not include about \$1.3 billion in costs that should be considered in future cost estimates and lists several contributing factors (delayed multiyear, inflation increases due to the new ramp, revised JSF savings, and change in avionics subcontractor)

Air Force Position: This assertion is incorrect; the GAO's assessment is based on an old program estimate. The latest 276 aircraft program office estimate, as documented in the FY04 PB, includes all of these factors.

- Schedule delays in developmental testing could delay the start of multiyear.

Air Force Position: The Air Force recognizes multiyear may well be impacted by delays in the start of DIOT&E and has accounted for these delays in the latest program estimate.

***GAO-03-431: Recommendations and Air Force Position***

1. SECDEF reconsider the decision to increase the annual production rate beyond 16 aircraft until greater knowledge of any need for modifications is established through completion of operational testing

Air Force Position: The Air Force fully supports the OSD position in this regard. Based on the cost analysis performed in support of the DoD's certification to the Congressional defense committees, in December 2002, we believe the costs associated with reducing the annual production rate to 16 aircraft would exceed the retrofit costs for these aircraft.

2. SECDEF update the 2002 risk assessment and certification with sufficient detail to allow verification of the conclusions

Air Force Position: The Air Force does not believe there is justification for updating the risk assessment and certification. The Air Force believes the current risk for retrofit on the F/A-22 program is low. F/A-22 systems having retrofit potential (structures and air vehicle subsystems) are tested and mature. Static testing and 1<sup>st</sup> lifetime fatigue testing are complete; in fact, we are currently 38% complete on the 2<sup>nd</sup> lifetime fatigue test. To date, we've identified no significant structural issues. For fin buffet, we've incorporated minor structural modifications to the tails (replacement of composite vertical fin rear spar with Titanium and strengthening of a rudder fastener). These modifications were folded into the production line for Lot 2 and we are incorporating low cost retrofits on all prior



aircraft (\$2M). Our highest risk (software stability) does not drive a retrofit risk; incorporation of stability fixes is anticipated to be a software-only issue.

**GAO-03-431: Other Air Force Comments**

Recent flight test activity has been extremely successful; the aircraft is meeting or exceeding all key performance parameters, except airlift, which is not required until system maturity at 100,000 hours. We also believe the GAO fails to adequately document the impacts of their recommendation in terms of increased F/A-22 program costs: inefficient ramp rate (learning curve), decreased supplier confidence (cost initiatives), inflationary penalties (delayed procurement), increased O&S costs due to delayed F-15 replacement (F/A-22 is 28% cheaper to operate than F-15), and increased operational risk (due to decreased combat capability caused by delayed fielding of F/A-22's revolutionary capabilities).

The GAO has essentially made the same recommendation relative to delaying F/A-22 production since March 2000. In March 2000, the GAO recommended decreasing Lot 1 production from 10 aircraft to 6 aircraft. The rationale was increased retrofit risk due to delayed testing. In March 2001, the GAO recommended decreasing Lot 2 production from 13 aircraft to 10 aircraft. The rationale at that time was increased retrofit risk due to the fact static and fatigue testing were not complete. In addition, the GAO highlighted horizontal tail disbonds and canopy cracks as contributory factors. In March 2002, the GAO recommended decreasing Lot 3 from 23 aircraft to 16 aircraft. The rationale at that time was that 1<sup>st</sup> lifetime fatigue testing was not complete. GAO identified fin buffet as an additional potential risk. The key takeaway is that despite the GAO recommendations, the program has successfully progressed through and resolved all the risk areas identified by the GAO since March 2000. There is no reason to believe this will not also be the case for the issues and risks identified in the March 2003 report.

**SUMMARY**

So we don't lose sight of the big-picture, this nation needs the F/A-22! I'll close my comments by summarizing the tremendous progress this program has made just in the last 6-9 months. We accelerated our envelope expansion test point burn down rate 2 1/2 times – the Raptor is now cleared to train pilots and will be cleared to conduct DIOT&E by mid-September. The development program has resolved several development issues that were once large areas of concern. Now we need to finish our work and 'slug out' the software instability issue the same way. The F/A-22 fleet just eclipsed 3,000 hour cumulative flying time, and during that time has demonstrated revolutionary performance. We've got seven aircraft flying almost daily at Edward Air Force Base and have completed 16 missile shots, 4 of them guided. The production program is ramping up nicely, production metrics are improving dramatically, and we're now delivering production Raptors to ACC, with the stand-up of our first operational site at Nellis Air Force Base.

The Raptor will propagate the American standard of Air Dominance for decades to come. Future Joint Force Commanders (JFCs) demand this aircraft to be available to them--the Air Force is working diligently to deliver to that expectation. Indeed, this is the only new US aircraft that will put a weapon on a target this decade.

I'd like to echo previous commitments to maintain an open dialog with this and all the defense committees. Thank you for this opportunity to provide you with an update on the F/A-22 program, and I look forward to your questions.

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United States General Accounting Office

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GAO

Testimony

Before the Subcommittee on Tactical Air  
and Land Forces, Committee on Armed  
Services, House of Representatives

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For Release on Delivery  
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TACTICAL AIRCRAFT

Status of the F/A-22  
Program

Statement of Allen Li, Director  
Acquisition and Sourcing Management



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GAO-03-603T

April 2, 2003

# GAO Highlights

Highlights of GAO-03-603T, a testimony before the Subcommittee on Tactical Air and Land Forces, House Committee on Armed Services

## Why GAO Did This Study

The Air Force is developing the F/A-22 aircraft to replace its fleet of F-15 air superiority aircraft. The F/A-22 is designed to be superior to the F-15 by being capable of flying at higher speeds for longer distances, less detectable, and able to provide the pilot with substantially improved awareness of the surrounding situation.

The National Defense Authorization Act for Fiscal Year 1998 requires us to annually assess the F/A-22 development program and determine whether the program is meeting key performance, schedule, and cost goals. We have issued six of these annual reports to Congress. We have also reported on F/A-22 production program costs over the last 3 years. Most recently, we reported on F/A-22 production and development in February and March 2003 respectively.

This testimony summarizes our work on the F/A-22 program, covering performance, cost, and scheduling issues.

## What GAO Recommends

GAO is not making recommendations in this testimony. However, recommendations in several prior GAO reports have stressed the need for the Air Force to not increase annual production rates until greater knowledge is achieved through the completion of testing.

[www.gao.gov/cgi-bin/gettr?p=GAO-03-603T](http://www.gao.gov/cgi-bin/gettr?p=GAO-03-603T)

To view the full testimony, click on the link above. For more information, contact Allen Li at (202) 512-4841 or [LiA@gao.gov](mailto:LiA@gao.gov).

## TACTICAL AIRCRAFT

### Status of the F/A-22 Program

#### What GAO Found

In the past several years, we have reported on a range of problems affecting the development of F/A-22. Specifically:

- F/A-22 estimated performance in the areas of supercruise, acceleration, maneuverability, radar observability, combat radius, and range in searching targets have so far been met or exceeded. However, problems have surfaced related to overheating during high-speed flight-testing, reliability, avionics that perform radar, communication, navigation, identification and electronic warfare functions as well as excess movement of the vertical tails. Modifications are being made to some test aircraft to address some of these problems. For now, however, testing in some areas is restricted.
- Each year since 1998, we have reported that assembly of the test aircraft was requiring more time than planned and that this was causing the test aircraft to be delivered late to the test center for flight-testing. We have also reported annually since 2000 that flight-test program efficiency—the amount of flight-testing accomplished—has been less than planned.
- Cost increases have plagued the F/A-22 program since development began in 1991. Since 1997, the Air Force's estimated cost to develop the F/A-22 has increased by \$3.2 billion bringing the total estimate to \$21.9 billion. In addition, over the last 6 years, DOD has identified about \$18 billion in estimated production cost growth bringing the total estimate to \$42.2 billion—which exceeds the congressionally mandated production cost limit of \$36.8 billion. Further, modernization costs have increased dramatically in recent years. Actions to offset estimated cost growth have had mixed success.

These problems have dramatically affected the F/A-22 program. Cost increases, in part, have forced the Air Force to substantially decrease the number of aircraft to be purchased—from 648 to 276. Delays in testing also have significant consequences. Continuing to acquire aircraft before adequate testing is a high-risk strategy that could serve to further increase production costs.

Moreover, F/A-22 problems have limited DOD's ability to upgrade its aging tactical aircraft fleet. If the F/A-22 program had met its original goals, the Air Force could have been replacing older aircraft with F/A-22 aircraft over 7 years ago. Now, however, it will not begin replacing aircraft until late 2005 at the earliest. The rate of replenishment will be substantially lower, due to the decrease in the number of new aircraft to be purchased. As a result, DOD will have to continue to use tactical aircraft that contribute to increased operating and support costs and it will have to wait longer than anticipated to have access to the advanced capabilities to be offered by the F/A-22.

United States General Accounting Office

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Chairman Weldon, Ranking Member Abercrombie, and Members of the Subcommittee:

I am pleased to be here today to discuss our work on the F/A-22 development and production programs. Today's hearing occurs at a critical time—with the Department of Defense (DOD) conducting operations overseas while seeking to respond to changes in security threats and still meeting the challenge of transforming the military. DOD is spending an average of \$150 billion annually on acquisition to support its current missions and to invest in future capabilities. The magnitude of this investment, combined with fiscal pressures across the government and the public's growing expectations for demonstrable results, clearly requires DOD to be as efficient and effective as possible in obtaining new weapons systems.

The F/A-22 Raptor, designed to be superior to any known or projected adversary aircraft, is a key component in DOD's modernization strategy as it is designed to replace the F-15 fighter. As you know, the Air Force started developing the F/A-22 in 1991. While it plans to complete development in July 2004, important operational test and evaluation activities have yet to be completed. Low-rate production was approved in August 2001, and the Air Force plans to procure a minimum of 276 aircraft for \$42.2 billion.

As requested, I will discuss our past and recent findings related to the F/A-22 program. Specifically, I will highlight the Air Force's progress in (1) addressing performance issues and the status of actions to address them; (2) resolving delays in flight-testing and (3) dealing with cost growth. I will also identify risks in the Air Force's acquisition plan. Problems in these areas have dramatically affected the program. For example, cost increases have been a factor in the Air Force substantially decreasing the number of aircraft to be purchased—from 648 to 276. Performance problems, which are now being addressed, have limited the Air Force's ability to test the aircraft. Delays in testing have significant consequences. Continuing to acquire aircraft before adequate testing is a high-risk strategy that could serve to further increase production costs.

Together, these problems have rippling effects on DOD's ability to upgrade its aging tactical aircraft fleet. If the F/A-22 program had met its original goals, the Air Force could have been replacing older aircraft with F/A-22 aircraft over 7 years ago. Now, however, it will not begin replacing aircraft until late 2005 at the earliest. Moreover, the rate of replenishment will be substantially lower, due to the decrease in the number of new aircraft to



be purchased. As a result, DOD will have to continue to use tactical aircraft that contribute to increased operating and support costs and it will have to wait longer than anticipated to have access to the advanced capabilities offered by the F/A-22.

## Background

The Air Force is developing the F/A-22<sup>1</sup> aircraft to replace its fleet of F-15 air superiority aircraft. The F/A-22 is designed to be superior to the F-15 by being capable of flying at higher speeds for longer distances, less detectable, and able to provide the pilot with substantially improved awareness of the surrounding situation.

The National Defense Authorization Act for Fiscal Year 1998<sup>2</sup> requires us to annually assess the F/A-22 development program and determine whether the program is meeting key performance, schedule, and cost goals. We have issued six of these annual reports to Congress. We have also reported on F/A-22 production program costs over the last 3 years. Most recently, we reported on F/A-22 production and development in February and March 2003, respectively.<sup>3</sup>

Following a history of increasing cost estimates to complete the development phase of the F/A-22 program, the National Defense Authorization Act for Fiscal Year 1998 established a cost limitation for both the development and production programs.<sup>4</sup> Subsequently, the National Defense Authorization Act for Fiscal Year 2002 eliminated the cost limitation for the development program but left the cost limit for production in place.<sup>5</sup> The production program is now limited to \$36.8

<sup>1</sup> "F/A" stands for fighter/attack aircraft. The Air Force changed the designation from F-22 to F/A-22 in September 2002 to reflect the aircraft's air-to-surface attack capability.

<sup>2</sup> P.L. 105-85, section 217, Nov. 18, 1997.

<sup>3</sup> See U.S. General Accounting Office, *Tactical Aircraft: DOD Needs to Better Inform Congress about Implications of Continuing F/A-22 Cost Growth*, GAO-03-280 (Washington D.C.: Feb. 28, 2003) and *Tactical Aircraft: DOD Should Reconsider Decision to Increase F/A-22 Production Rates While Development Risks Continue*, GAO-03-431 (Washington D.C.: Mar. 14, 2003).

<sup>4</sup> P.L. 105-85, section 217, Nov. 18, 1997.

<sup>5</sup> P.L. 107-107, section 214, Dec. 28, 2001.

billion.<sup>6</sup> The current cost estimate of the development program is \$21.9 billion.

## Performance Issues

In the past several years, we have reported on a range of performance issues that have arisen during the development of the F/A-22. F/A-22 estimated performance in the areas of supercruise, acceleration, maneuverability, radar observability, combat radius, and radar range in searching targets have so far been met or exceeded. However, problems have surfaced related to some overheating concerns during high-speed flight-testing, reliability, avionics that perform radar, communication, navigation, identification and electronic warfare functions as well as excess movement of the vertical tails. Modifications are being made to some test aircraft to address some of these problems. For now, however, testing in some areas is restricted.

In 2001, we reported on continuing increases in aircraft weight and that more frequent maintenance than planned on the aircraft was being required. We also reported on structural inadequacies in the aft (rear) fuselage and on problems with the separation of some materials within the horizontal tail section and cracking of the clear section of the canopy. In 2002, we again reported that the F/A-22's performance could be affected by increased aircraft weight and maintenance needs as well as a potential problem with "buffeting", or excessive movement, of the aircraft's vertical tails. We also continued to report on problems with the separation of materials within the horizontal tail section and cracking of the clear section of the canopy.

We reported last month that the F/A-22 developmental program did not meet key performance goals established for fiscal year 2002 and continues to confront numerous technical challenges, specifically:

- **Avionics instability:** Software instability has hampered efforts to integrate advanced avionics capabilities into the F/A-22 system. Avionics control and integrated airborne electronics and sensors are designed to provide an increased awareness of the situation around the pilot. The Air Force told us avionics have failed or shut down during numerous tests of F/A-22 aircraft due to software problems. The shutdowns have occurred when the pilot attempts to use the radar, communication, navigation, identification,

<sup>6</sup> The cost limitation, before adjustment under the act's provisions, was \$43.4 billion.

and electronic warfare systems concurrently. Although the plane can still be flown after the avionics have failed, the pilot is unable to successfully demonstrate the performance of the avionics. Therefore, the Air Force has had to extend the test program schedule.

The Air Force has recognized that the avionics problems pose a high technical risk to the F/A-22 program, and in June 2002 the Air Force convened a special team to address the problem. According to the team, the unpredictable nature of the shutdowns was not surprising considering the complexity of the avionics system. The team recommended that the software be stabilized in the laboratory before releasing it to flight-testing. The team further recommended conducting a stress test on the software system architecture to reduce problems and ensure it is operating properly. The Air Force implemented these recommendations. Further, the Air Force extended the avionics schedule to accommodate avionics stability testing and it now plans to complete avionics testing in the first quarter of 2005. However, Air Force officials stated they do not yet understand the problems associated with the instability of the avionics software well enough to predict when they will be able to resolve this problem.

- Vertical fin buffeting: Under some circumstances, the F/A-22 experiences violent movement, or buffeting, of the vertical fins in the tail section of the aircraft. Buffeting occurs as air, moving first over the body and the wings of the aircraft, places unequal pressures on the vertical fins and rudders. The buffeting problem has restricted the testing of aerial maneuvers of the aircraft. In addition, unless the violent movement is resolved or the fins strengthened, the fins will break over time because the pressures experienced exceed the strength limits of the fins. This could have an impact on the expected structural life of the aircraft. Lockheed Martin has developed several modifications to strengthen the vertical fins.
- Overheating concerns: Overheating in the rear portions of the aircraft has significantly restricted the duration of high-speed flight-testing. As the F/A-22 flies, heat builds up inside several areas in the rear of the aircraft. Continued exposure to high temperatures would weaken these areas. For example, a portion of the airframe that sits between the engines' exhausts experiences the highest temperatures. This intense heat could weaken or damage the airframe. To prevent this heat buildup during flight-testing, the aircraft is restricted to flying just over 500 miles per hour, about the same

speed as a modern jet liner, and significantly below the supercruise<sup>7</sup> requirement. Currently, the F/A-22 flies with temperature sensors in those areas of the aircraft and slows down whenever the temperature approaches a certain level. The Air Force may incorporate a modification that adds copper sheets to the rear of the aircraft to alleviate the problem. The Air Force began these modifications in January 2003 and plans to complete them by July 2003.

- **Horizontal tail material separations:** F/A-22 aircraft have experienced separations of materials in the horizontal tail and the shaft, which allow the tail to pivot. Because the separations reduce tail strength, the Air Force restricted flight-testing of some aircraft until it had determined that this problem would not affect flight safety during testing. The Air Force and the contractor initially believed that improvements to the aircraft's manufacturing process would solve this problem. However, the Air Force has determined that it could only solve this problem by redesigning the aircraft's tail. The Air Force plans to conduct flight-testing of the redesigned tail between February 2004 and April 2004.
- **Airlift support requirements:** The Air Force estimates it will not meet the F/A-22 airlift support requirement—a key performance parameter.<sup>8</sup> The airlift support requirement is that 8 C-141 aircraft or their equivalents would be sufficient to deploy a squadron of 24 F/A-22s for 30 days without resupply. Today, the Air Force estimates that 8.8 C-141 equivalents will be necessary.
- **Impact of maintenance needs on performance:** The F/A-22's performance may also be affected by maintenance needs that exceed established objectives. The Air Force estimates that the F/A-22 should, at this point in its development, be able to complete 1.67 flying hours between maintenance actions and 1.95 flying hours by the end of development. However, aircraft are requiring five times the maintenance actions expected at this point in development. As of November 2002, the development test aircraft have been completing only .29 flying hours between maintenance actions. Therefore, the development test aircraft are spending more time than planned on the ground undergoing maintenance.

<sup>7</sup> Supercruise is the aircraft's ability to travel at high speeds for long ranges. The F/A-22's supercruise requirement is approximately 1,000 miles per hour.

<sup>8</sup> U.S. General Accounting Office, *Tactical Aircraft: F-22 Delays Indicate Initial Production Rates Should Be Lower to Reduce Risks*, GAO-02-238 (Washington, D.C.: Mar. 6, 2002).

## Flight Test Schedule Delays

Testing is instrumental to gauging the progress being made when an idea or a concept is translated into an actual product that people use. DOD divides testing into two categories: developmental and operational. The goal of developmental tests is to determine whether the weapon system meets the technical specifications of the contract. The goal of operational testing is to evaluate the effectiveness and suitability of the weapon system in realistic combat conditions. Operational testing is managed by different military test organizations that represent the customers, such as the combat units that will use the weapons. The results of operational tests are provided to Congress as well as the Secretary of Defense and senior service officials.

Our reviews over the years have underscored the importance of not delaying tests too late in development—when it is more difficult, costly, and time consuming to fix any problems discovered. Yet, we have been reporting on delays of flight tests for the F/A-22 and that these delays have contributed to scheduling and cost problems affecting the program.

F/A-22 flight-testing began in late 1997. Each year since 1998, we have reported that assembly of the test aircraft was requiring more time than planned and that this was causing the test aircraft to be delivered late to the test center for flight-testing. We have also reported annually since 2000 that the flight-test program efficiency—the amount of flight-testing accomplished—has been less than planned.

In March 2003, we reported that F/A-22 flight-testing was slower than expected in 2002 in all test areas according to Office of the Secretary of Defense (OSD) testing officials. Consequently, the Air Force extended flight test schedules and reduced the number of flight tests. Many tasks originally planned for 2002 were rescheduled for 2003. Further, the Air Force now plans to conduct more developmental flight-testing concurrently with operational testing.

Continuing technical problems were the primary reasons for the most recent delay in flight-testing. In addition, late delivery of development aircraft to the flight-test center continued to be a contributing problem. Late deliveries were due not only to technical problems but also to ongoing problems associated with the manufacture and assembly of development aircraft by the prime contractor.

With the new schedule, the Air Force delayed the beginning of operational testing for 4 months, until the portion of developmental testing required to begin operational testing could be completed. Operational testing is now



planned to begin in August 2003. Table 1 shows the changes in key F/A-22 schedule events.

**Table 1: Schedule Changes for Key F/A-22 Test Program Events**

Key Events	Prior Schedule	Revised Schedule	Change in months
Completion of development flight testing necessary prior to operational testing	Apr. 2003	Aug. 2003	4
Start of operational testing	Apr. 2003	Aug. 2003	4
Completion of operational testing	Dec. 2003	Jul. 2004	7
High-rate production decision	Mar. 2004	Mar. 2004	0

Source: U.S. Air Force

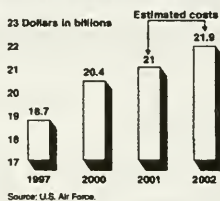
Further, according to OSD officials involved in operational testing, there is a high risk of not completing an adequate amount of development flight-testing before operational testing is scheduled to begin. Indeed, we believe that it is unlikely that the Air Force will be able to complete all necessary avionics flight-testing prior to the planned start of operational testing. Based on F/A-22 flight test accomplishment data and current flight test plans, we project that the start of operational testing might be delayed until January 2004. As a result, operational testing could be delayed by several months beyond the current planned date of August 2003.

## Cost Increases

Cost increases have plagued the F/A-22 program since it began in 1991. They have spurred Congress to impose spending limits and have forced the Air Force to scale back production. Nevertheless, the Air Force is still contending with cost increases in three principal areas: development, production, and modernization.

### Development Costs

Since 1997, the Air Force's estimated cost to develop the F/A-22 has increased by \$3.2 billion. Figure 1 highlights development cost limitation and estimate increases during the past 6 years.

**Figure 1: Development Cost Limitation and Estimate Increases Since 1997**

Increases prior to 1998 have prompted limitations on spending from Congress. While the Air Force held the position that these limitations could be met until recently, our reviews showed that there was a potential for additional increases because of delays. Table 2 presents a time line of congressional limitations, our findings and DOD's positions.

Table 2: Chronology of Development Cost Growth

Year of GAO report (or March)	Congressional limitation/ DOD estimate	GAO findings	DOD position
1997	\$16.688 billion (1997)	SCA	N/A
1999	\$18.884 billion <sup>a</sup>	Schedule delays may impact cost estimates.	Development can be completed within cost limitation.
1999	\$18.939 billion	Schedule cost growth of \$462 million.	Development can be completed within cost limitation.
2000	\$18.880 billion <sup>b</sup> Adjusted to \$20.443 billion in May 2000.	Working with cost limit depends on (1) completing the development program as scheduled and (2) achieving portfolio cost growth.	Development can be completed within cost limitation.
2001	\$20.443 billion Cost limitation removed in late 2001.	Flight testing and operational testing completion likely delayed, resulting in additional cost growth. Recommend limiting production rate.	Congressionally approved increase in cost limit will be necessary to complete adequate testing.
2002	DOD estimate \$21 billion Changed to \$21.9 billion in Dec. 2002.	Costs likely to exceed \$21 billion estimate. Recommend DOD address costs to complete development and initial production rate.	Air Force increases estimate by \$557 million to \$21 billion to ensure adequate testing.
2003	\$21.9 billion	Schedule delays likely to impact development and testing decision, increase production rate.	DOD acknowledges \$876 million cost growth. Estimate grows to \$21.9 billion.

Source: GAO.

<sup>a</sup>Adjusted to reflect conference direction and reduced effect of inflation.<sup>b</sup>Adjusted for inflation.

The initial congressional limitation of \$18.688 billion established in 1997 followed an Air Force team's review of estimated development and production costs. That team concluded in 1997 that additional time would be required to complete the development program and estimated that costs would increase from \$17.4 billion to \$18.688 billion. The team recommended several changes to the development program's schedule, including slower manufacturing than planned for a more efficient transition from development to low-rate initial production and an additional 12 months to complete avionics development.

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The National Defense Authorization Act for Fiscal Year 1998 then established this \$18.688 billion amount as a cost limitation for the development program.<sup>9</sup> Congressional direction in fiscal year 2000 legislation shifted six production representative test aircraft to the development program and caused the cost limitation to be adjusted upward to \$20.4 billion. In September 2001, DOD acknowledged that the cost to complete the development program would exceed the cost limitation by \$557 million. This increase brought the development cost estimate to \$21 billion. Subsequently, in December 2001, the National Defense Authorization Act for fiscal year 2002 eliminated the development cost limitation.

In March 2003, we reported that the Air Force estimated that development costs had increased by \$876 million, bringing total development cost to \$21.9 billion. This increase was due to the technical problems and schedule delays related to avionics and vertical fin buffeting discussed earlier.

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#### Production Cost Growth

Over the last 6 years, DOD has identified about \$18 billion in estimated production cost growth during the course of two DOD program reviews. As a result, the estimated cost of the production program currently exceeds the congressional cost limit. The Air Force has implemented cost reduction plans designed to offset a significant amount of this estimated cost growth. But the effectiveness of these cost reduction plans has varied.

During a 1997 review, the Air Force estimated cost growth of \$13.1 billion.<sup>10</sup> The major contributing factors to this cost growth were inflation, increased estimates of labor costs and materials associated with the airframe and engine, and engineering changes to the airframe and engine. These factors made up about 75 percent of the cost growth identified in 1997.

In August 2001, DOD estimated an additional \$5.4 billion in cost growth for the production of the F/A-22, bringing total estimated production cost to \$43 billion. The major contributing factors to this cost growth were again due to increased labor costs and airframe and engine costs. These factors totaled almost 70 percent of the cost growth. According to program

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<sup>9</sup> P.L. 105-85, section 217, Nov. 18, 1997.

<sup>10</sup> Based on a plan to procure 438 aircraft.

### Mixed Success With Cost Reduction Plans

officials, major contractors' and suppliers' inability to achieve the expected reductions in labor costs throughout the building of the development and early production aircraft has been the primary reason for estimating this additional cost growth.

The Air Force was able to implement cost reduction plans and offset cost growth by nearly \$2 billion in the first four production contracts awarded. As shown in table 2, the total offsets for these contracts slightly exceeded earlier projections by about \$.5 million.

**Table 3: Comparison of Planned Versus Implemented Cost Reduction Offsets for Awarded Production Contracts**

(Dollars in millions)			
Production lot	Planned offsets	implemented offsets	Difference
Fiscal Year 1999 (2 aircraft)	\$199.0	\$200.5	\$1.5
Fiscal Year 2000 (6 aircraft)	\$329.3	\$336.4	\$7.1
Fiscal Year 2001 (10 aircraft)	\$580.2	\$611.1	\$30.9
Fiscal Year 2002 (13 aircraft)	\$827.2	\$788.2	\$(39.0)
<b>Total</b>	<b>\$1,935.7</b>	<b>\$1,936.2</b>	<b>\$.5</b>

Source: Air Force

Cost reduction plans exist but have not yet been implemented for subsequent production lots planned for fiscal years 2003 through 2010 because contracts for these production lots have not yet been awarded. If implemented successfully, the Air Force expects these cost reduction plans to achieve billions of dollars in offsets to estimated cost growth and to allow the production program to be completed within the current production cost estimate of \$43 billion.<sup>11</sup> However, this amount exceeds the production cost limit of \$36.8 billion.

In addition, while the Air Force has been attempting to offset costs through production improvement programs (PIP), recent funding cutbacks for PIPs may reduce their effectiveness. PIPs focus specifically on improving production processes to realize savings by using an initial government investment. The earlier the Air Force implements PIPs, the greater the impact on the cost of production. Examples of PIPs previously

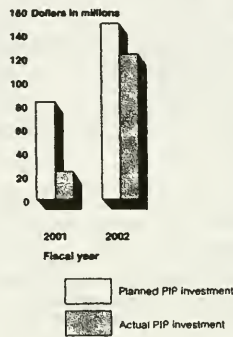
<sup>11</sup> The F/A-22 President's budget for fiscal year 2004 would transfer \$876 million in production funding to help fund estimated cost increases in development. As a result, the current production cost estimate is \$42.2 billion.



implemented by the Air Force include manufacturing process improvements for avionics, improvements in fabrication and assembly processes for the airframe, and redesign of several components to enable lower production costs.

As shown in figure 2, the Air Force reduced the funding available for investment in PIPs by \$61 million for lot 1 and \$26 million for lot 2 to cover cost growth in production lots 1 and 2.<sup>12</sup> As a result, it is unlikely that PIPs covering these two lots will be able to offset cost growth as planned.

**Figure 2: Planned Versus Actual F/A-22 Production Improvement Program Investment for Production Lots 1 (Fiscal Year 2001) and 2 (Fiscal Year 2002)**

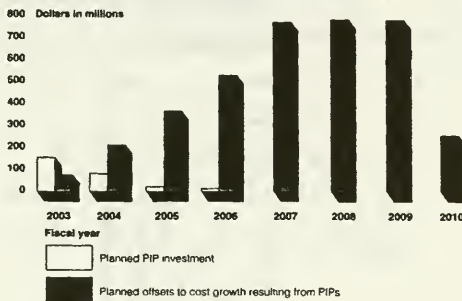


Source: U.S. Air Force.

Figure 3 shows the remaining planned investment in PIPs through fiscal year 2006 and the \$3.7 billion in estimated cost growth that can potentially be offset through fiscal year 2010 if the Air Force invests as planned in these PIPs.

<sup>12</sup> Production lot 1 was awarded in fiscal year 2001 and production lot 2 was awarded in fiscal year 2002.

Figure 3: Planned Offsets to Cost Growth From Investing In and Implementing PIPs



Source: U.S. Air Force.

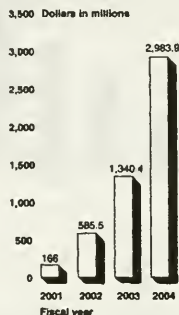
In the past, Congress has been concerned about the Air Force's practice of requesting fiscal year funding for these PIPs but then using part of that funding for F/A-22 airframe cost increases.<sup>13</sup> Recently, Congress directed the Air Force to submit a request if it plans to use PIP funds for an alternate purpose.

## Modernization Cost Increases

Modernization costs have increased dramatically in recent years. In fiscal year 2001, the Air Force plan was to spend a total of \$166 million for upgrades to enhance the operational capabilities of the F/A-22. Currently, Air Force plans in 2004 call for spending almost \$3 billion through fiscal year 2009 for modernization projects. (See fig. 4). Most of the recent increase in modernization funding is necessary to provide increased ground attack capability. Other modernization projects include upgrading avionics software, adding an improved short-range missile capability, upgrading instrumentation for testing, and incorporating a classified project.

<sup>13</sup> Report 107-298, Nov. 19, 2001.

Figure 4: Planned Modernization Funding Increases, Fiscal Year President's budgets for 2001-2004



Source: U.S. Air Force

## Broader Effects of Cost Increases

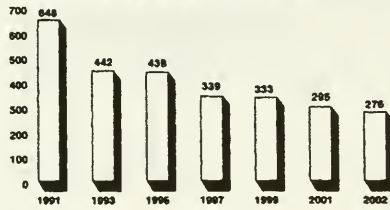
The cost increases experienced by the F/A-22 program have, in part, forced the Air Force to reduce its planned procurement over time by more than half (see fig. 5). Such a decrease, in turn, has jeopardized the Air Force's ability to modernize its fleet of tactical aircraft.

In late 2001, in the face of a significant cost overrun in the estimated cost to produce the F/A-22, the total aircraft to be produced was reduced. At the same time, DOD requested that Congress remove the production cost limit. While the congressional limit on production costs remains in effect, DOD transferred production funding to help offset \$876 million in development cost growth. The net effect was another decrease in total aircraft to be produced—now estimated at 276.

This reduction may have a negative effect on Air Force plans to modernize its tactical aircraft fleet. The F/A-22 is designed to be a replacement for the F-15 aircraft, but the F/A-22 quantity reductions that have occurred since 1991 tend to exacerbate the increasing trend in the average age of current Air Force fighter aircraft. In 2001, we reported that the average age of Air Force tactical fighters would continue to increase until the fleet reached an average age of 21 years in 2011. This is almost twice the average age

goal of the Air Force. Aging equipment contributes significantly to increased operating and support costs.

Figure 5: Aircraft Quantity Reduction Since 1991



Source: U.S. Air Force.

## Risks in the F/A-22 Acquisition Plan

Despite continuing development problems and challenges, the Air Force plans to continue acquiring production aircraft at increasing annual rates. For example, the Air Force plans to acquire 20 aircraft during 2003, rather than the maximum of 16 Congress allowed without DOD's submittal of a risk assessment and certification.<sup>14</sup> Since 2001, we have reported that this is a very risky strategy because the Air Force runs the chance of higher production costs by acquiring significant quantities of aircraft before adequate testing is complete. Late testing could identify problems requiring costly modifications to achieve satisfactory performance.

As shown in figure 6, the Air Force is committed to acquiring 73 production aircraft (26 percent) before operational and development testing is complete. We believe that this is an overly optimistic strategy given the remaining F/A-22 technical problems and the current status of testing. As we have noted, acquiring aircraft before completing adequate testing to resolve significant technical problems increases the risk of costly modifications later. If F/A-22 testing schedules slip further—as we believe is likely—even more aircraft will be acquired before development

<sup>14</sup> DOD justified this strategy in the December 2002 risk assessment and certification it submitted to Congress.

and operational testing is complete, and the risk of costly modifications will increase still more.

Figure 6: Number of Production Aircraft on Contract Prior to Completion of Operational Testing

	Completion of operational testing													
Actual buy schedule	2	6	10	13	20	22	24	26	32	32	32	32	25	276
Cumulative production aircraft buy	2	8	18	31	51	73	97	123	155	187	219	251		276
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	
	Fiscal year													

Source: U.S. Air Force.

## Conclusions

The F/A-22 has the potential for being the most advanced air superiority aircraft ever to join the Air Force's inventory—using several advanced technologies and capabilities. But performance problems, schedule delays, and cost overruns threaten the program's success as well as DOD's ability to modernize its tactical aircraft fleet. Moreover, uncertainties about some of the performance capabilities have increased the risk that the Air Force will have to modify a larger quantity of aircraft after they are built. For these reasons, our recommendations have stressed the need for the Air Force to (1) avail itself of all opportunities for gaining manufacturing efficiencies during production, (2) find ways to fund cost reduction plans that require initial government investment instead of using funding to cover cost growth in earlier aircraft lots, and (3) reconsider its decision to increase the annual production rate beyond 16 until greater knowledge on any need for modifications is established through operational testing. Moreover, we have also recommended, in light of the high risk nature of the program, that Congress be informed about the amount of cost reduction plans identified to offset cost growth, the potential cost of production if cost reduction plans are not as effective as planned, or the quantity of aircraft that can be produced within the cost limit. Congress would be able to use this information to help exercise proper program oversight.



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Mr. Chairman, that concludes my statement. I will be happy to respond to any questions you or other Members of the Subcommittee may have.

**Contacts and Acknowledgements**

For future questions regarding this testimony, please contact Allen Li, (202) 512-4841. Individuals making key contributions include Marvin E. Bonner, Edward Browning, Cristina Chaplain, Gary Middleton, Sameena Nooruddin, Don M. Springman, and Ralph White.



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**QUESTIONS AND ANSWERS SUBMITTED FOR THE  
RECORD**

APRIL 2, 2003

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### QUESTIONS SUBMITTED BY MR. SCHROCK

Mr. SCHROCK. Mr. Secretary, much as U.S. and Coalition forces are trying to disrupt Saddam Hussein's command and control capabilities, we are working to ensure that our C2 systems are diverse and fielded in adequate quantities. We are aware that some number of E-2C aircraft are not outfitted with the Mini-Dama UHF SATCOM systems that give them reachback communications to battlegroups and shore stations. Is the Navy taking steps to ensure that all E-2C aircraft are equipped with this important command and control capability?

Secretary YOUNG. Subsequent to the hearing, 19 Mini-DAMA SATCOM systems were delivered to E-2C fleet squadrons from June through December 2003, almost meeting the E-2C fleet need. The FY 2004 Congressional plus-up for an additional five Mini-DAMA systems will provide all the systems that the E-2C fleet will need to fully outfit its Mini-DAMA capable aircraft. All aircraft delivered since February 2002, have ARC-210 SATCOM integrated into the aircraft.

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### QUESTIONS SUBMITTED BY MR. MCINTYRE

Mr. MCINTYRE. What is the average age of the F-14 Tomcat in service now?

Admiral FITZGERALD. The average age for F-14 aircraft is 18 years. The oldest aircraft in service is 31 years. Twenty aircraft currently in service are in excess of 25 years of age.

Mr. MCINTYRE. What is the average age of the A-10s, the Warthogs or Thunderbolts that are being used now; do you know?

Dr. SAMBUR. All actively flying A-10s were delivered to the AF between 1979 and 1984. The average age is 22 years.

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### QUESTIONS SUBMITTED BY MR. LOBIONDO

Mr. LOBIONDO. I have serious concerns about the future status and longevity of our F-16 Fleet, which currently comprises 50% of the precision fighter force. The Air Force is no longer buying F-16s and the Joint Strike Fighter is not coming on line any sooner. What, if anything, are you doing to deal with the "gap" that will result as F-16 airframes wear out before they can be replaced by Joint Strike Fighters besides service life extension programs? How can we help?

General KEYS. The F-16, along with the entire fighter force structure and its capability requirements continue to be analyzed. Air Combat Command is developing fighter roadmaps in support of our emerging CONOPS for Global Persistent Attack, Homeland Security, and Global Strike. In July, we are scheduling a Capability Review and Risk Assessment that will help us smartly invest/divest force structure to maintain and improve combat capabilities as we mesh the emerging capabilities of the Joint Strike Fighter with our aging, yet capable, F-16 fleet. Additionally, new F-16 radar and weapons modernization programs, along with advanced targeting pods, are being prioritized for funding. These programs augment our funded service life extension programs to keep the F-16 fleet viable and combat relevant.

General CORLEY. The F-16, along with the entire fighter force structure and its capability requirements continue to be analyzed. Air Combat Command is developing fighter roadmaps in support of our emerging CONOPS for Global Persistent Attack, Homeland Security, and Global Strike. In July, we are scheduling a Capability Review and Risk Assessment that will help us smartly invest/divest force structure to maintain and improve combat capabilities as we mesh emerging capabilities of the Joint Strike Fighter with our aging, yet capable, F-16 Fleet. Additionally, new F-16 radar and weapons modernization programs, along with advanced targeting pods, are being prioritized for funding. These programs augment our funded service life extension programs to keep the F-16 fleet viable and combat relevant.

Mr. LOBIONDO. Missions in Afghanistan and Iraq are increasing the number of TACAIR flight hours per year dramatically, which as we all know, shorten the life of these airplanes. How much have your flying hours increased past those originally programmed?



General KEYS. In FY03, the Air Force fighter aircraft flew 103.3 percent or a total of +18,461 hours over their flying hours programs (559,896 hours = program, 578,357 hours = executed). This percentage includes active, Air National Guard, and Air Force Reserve programmed and executed hours. These hours include combat/ combat support, training and research, development and test hours (all O&M hours).

The F-16 (active, Air National Guard and Air Force Reserve) MDS flew 103.7 percent or a total of +9,916 hours over their flying hours program (267,282 = programmed hours, 277,198 hours = executed).

General CORLEY. In FY03, the Air Force fighter aircraft flew 103.3 percent or a total of +18,461 hours over their flying hour program (559,896 hours = program, 578,357 hours = executed). This percentage includes active, Air National Guard and Air Force Reserve programmed and executed hours. These hours include combat/ combat support, training and research, development and test hours (all O&M hours).

The F-16 Model Design Series (active, Air National Guard and Air Force Reserve) MDS flew 103.7 percent or a total of +9,916 hours over their flying hours program (267,282 = programmed hours, 277,198 hours = executed).

### QUESTIONS SUBMITTED BY MR. WILSON

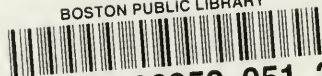
Mr. WILSON. The Air Force is requesting \$12 million for a new start called the Common Aero Vehicle program. Can you explain what the program is intended to accomplish?

Dr. SAMBUR. The Common Aero Vehicle (CAV) is an unpowered, maneuverable, global range, delivery vehicle operating through space capable of putting up to 1,000 pounds of conventional weapons/payloads precisely on a target following boosted flight within minutes of release order. The current program is a joint Air Force/Defense Advanced Research Projects Agency (DARPA) demonstration designed to develop and validate, in-flight, CAV technologies as well as a responsive small launch vehicle. Titled Force Application from CONUS (FALCON), the demonstration will enable both near-term and far-term capabilities to execute time-sensitive, prompt global reach missions. A more detailed report on prospective CAV operations will be delivered to the Committee by March 2004.





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